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# Soils of Colchester County, Nova Scotia

Report No. 19 Nova Scotia Soil Survey 1991

Canada

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Report No. 19
Nova Scotia Soil Survey

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Jane T. Buckley

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# SUMMARY

Colchester County encompasses approximately 365 000 ha of land and is located in north central Nova Scotia between 62° 45'and 64° 15' west longitude and 45° 00' and 45° 45' north latitude.

Colchester County has a cool, humid, temperate climate. Mean annual temperature is 5.8° C; annual precipitation is 1224 mm and snowfall averages 214 cm. Annual total degree days above 5° C average 1700 and the average frost free period is 99 days.

Forests cover 80% of the land and at last inventory were composed of 44% softwood forest, 23% hardwood forest, and 33% mixed wood forest.

Colchester County was glaciated during the Wisconsin glaciation, however the drift was not transported far and therefore bares close similarity to the underlying bedrock. Glacial tills are the dominant surficial materials in all physiographic areas of the county.

The Northumberland Lowlands and the coastal and southern half of the Minas Lowlands are undulating to rolling plains, which are blanketed with acidic, moderately coarse- to moderately fine-textured tills derived from shale and sandstone. Soils developed on these materials commonly have dense, slowly permeable subsoils and are predominantly Gleyed Podzols and Orthic Gleysols of the Pugwash and Hansford associations, and Gleyed Gray Luvisols and Luvic Gleysols of the Queens Association. The Minas Lowlands increase in elevation to the east and north. In these areas the landscape is more rolling and dissected. The soils are stony, acidic, moderately coarse-textured Orthic Podzols, Gleyed Podzols, and Orthic Gleysols of the Woodbourne, Thom, Millbrook, Folly, and Portapique associations.

The Cobequid Upland is a steep sided plateau-like area that rises above the Lowlands to a fairly uniform elevation of 275 m above sea level. Its rolling to hummocky surface is covered by a thin blanket of acidic, stony, moderately coarse-textured tills derived from the underlying igneous, metamorphic, and sedimentary bedrock. The soils are very stony, commonly shallow to bedrock, Orthic and Gleyed Podzols and Orthic Gleysols of the Wyvern, Cobequid, Westbrook, and Thom associations.

The Horton Highlands and Southern Upland are found along the southern border of the county and rise from the Minas Lowlands to an elevation of above 200 m above sea level. These areas are dissected and hilly and are covered with acidic, stony, moderately coarse-textured tills derived from the underlying sedimentary and metamorphic bedrock. The soils are stony, commonly shallow to bedrock, Orthic and Gleyed Podzols of the Perch Lake, Kirkhill, and Rawdon associations.

The suitability of each map unit is interpreted for agriculture, community development, forestry, and source of material uses.

# RÉSUMÉ

Le comté de Colchester compte environ 365 000 ha de terre et se situe dans le centre-nord de la Nouvelle-Écosse entre 62° 45' et 64° 15' de longitude ouest et 45° 00' et 45° 45' de latitude nord.

Le comté de Colchester se caractérise par un climat frais, humide et tempéré. La température moyenne annuelle est de 5,8 °C, les précipitations annuelles sont de l'ordre de 1 224 mm et l'enneigement atteint en moyenne 214 cm. Le nombre total de degrés-jours par année au-dessus de 5 °C est en moyenne de 1 700 et la durée moyenne sans gelées est de 99 jours.

La forêt occupe 80 % de la superficie et, selon le dernier inventaire, se compose de 44 % de bois tendre, de 23 % de bois dur et de 33 % de bois mélangé.

Le comté a subi la glaciation Wisconsin, mais les matériaux glaciaires n'ont pas été transportés loin de sorte qu'ils ressemblent beaucoup à la roche-mère sous-jacente. Les tills sont les matériaux superficiels dominants dans toutes les régions physiographiques du comté.

Les Basses-Terres Northumberland, ainsi que la moitié côtière et méridionale des Basses-Terres Minas, sont constituées de plaines ondulées recouvertes de tills acides, modérément grossiers à modérément fins, dérivés de schiste et de grès. Les sols formés sur ces matériaux ont des sous-sols couramment denses et lentement perméables, et se composent surtout de podzols gleyifiés et de gleysols orthiques des associations Pugwash et Hansford, ainsi que de luvisols gris gleyifiés et de gleysols luviques de l'association Queens. Les Basses-Terres Minas s'élèvent vers l'est et le nord où le relief est plus ondulé et accidenté. Les sols se composent de podzols orthiques, de podzols gleyifiés et de gleysols orthiques modérément grossiers, pierreux et acides des associations Woodburne, Thom, Millbrook, Folly et Portapique.

La haute plaine de Cobequid est une région de plateaux escarpés qui s'élève au-dessus des Basses-Terres à une altitude assez uniforme de 275 m au-dessus du niveau de la mer. Sa surface ondulée à bosselée est couverte d'une mince couche de tills modérément grossiers, acides et pierreux dérivés de la roche-mère sous-jacente d'origine ignée, métamorphique et sédimentaire. Les sols sont des podzols orthiques et gleyifiés, et des gleysols orthiques très pierreux et généralement superficiels des associations Wyvern, Cobequid, Westbrook et Thom.

Les Hautes-Terres Horton et la haute plaine du sud se retrouvent le long de la frontière sud du comté et s'élèvent des Basses-Terres Minas à une altitude de plus de 200 m au-dessus du niveau de la mer. Ces régions sont accidentées et montueuses, et couvertes de tills modérément grossiers, acides et pierreux, dérivés de la roche-mère sous-jacente sédimentaire et métamorphique. Les sols sont composés de podzols orthiques et gleyifiés, pierreux et généralement superficiels des associations Perch Lake, Kirkhill et Rawdon.

Chaque unité cartographique est interprétée quant à ses aptitudes pour l'agriculture, le développement communautaire, l'exploitation forestière et l'origine des matériaux utilisés.

## Part 1. GENERAL DESCRIPTION OF THE COUNTY

### Location and extent

Colchester County is located in north-central Nova Scotia between longitude 62° 45′ and 64° 15′ west and latitude 45° 00′ and 45° 45′ north. The county is bordered by Pictou County to the east, Halifax County to the south, Hants County to the southwest, and Cumberland County to the west. Colchester County has about 40 km of convoluted coastline to the north on Northumberland Strait and about 80 km to the southwest on Cobequid Bay, the south arm of the Bay of Fundy (Fig. 1). The county covers 365 810 ha of which about 2.0%, or 7310 ha, are lakes and rivers.

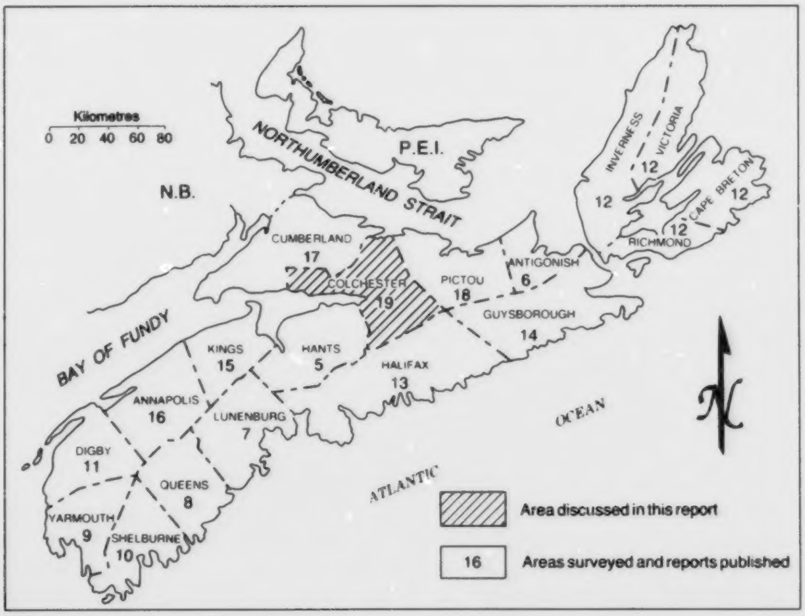

Kilometres
0 20 40 60 80
N.B.
P.E.I.
NORTHUMBERLAND STRAIT
BAY OF FUNDY
CUMBERLAND 17
COLCHESTER 19
PICTOU 18
ANTIGONISH 6
GUYSBOROUGH 14
INVERNESS
VICTORIA
CAPE BRETON
RICHMOND
12
KINGS 15
HANTS 5
HALIFAX 13
ANNAPOLIS 16
LUNENBURG 7
DIGBY 11
QUEENS 8
YARMOUTH 9
SHELBURNE 10
ATLANTIC OCEAN
N
Area discussed in this report
16 Areas surveyed and reports published

Fig. 1. Location of Colchester County and areas of Nova Scotia previously surveyed.

### History of development

European settlement of Colchester County began in the 1600s with the arrival of the Acadians. By 1703, Acadian settlements in Colchester County were scattered as far south as Stewiacke, as far north as Tatamagouche, and as far west as Five Islands (Creighton 1979). The Colchester County settlers shared the agrarian heritage of Acadians at Port Royal and Grand Pre and dyked and drained the fertile marshes surrounding Cobequid Bay. However, the Acadians were perceived as a threat to British settlements in Nova Scotia, and in 1755 they were expelled from their homes.

Following the expulsion of the Acadians, an influx of immigrants to Colchester County began. From 1760 to the end of the century, Colchester County received several waves of immigration from New England, Ireland, Scotland, and other parts of Nova Scotia, the largest of which was the United Empire Loyalists. The immigrants settled from Truro west to Economy and north to North River. In the 1770s settlements were established at Tatamagouche and along the shores of Northumberland Strait. The Stewiacke-Brookfield area was settled in the 1780s.

Farming continued to be the major occupation throughout the 1800s, but the presence of grist mills, tanneries, lumber mills, and shipyards indicated that the economic base was expanding, and by 1854 the population of Colchester County had grown to 15 469. During the mid-1860s shipbuilding was at its height with major building centres at Great Village, Tatamagouche, Clifton, and Old Barns.

A rail line linking Truro with Halifax was completed in 1858, which provided county farmers rapid access to the Halifax market. By 1861 the population of the county had increased to 20 045.

In 1872 Truro was linked to Amherst via the Intercontinental Railway, which stimulated the growth of manufacturing in Truro. By the end of the century, Truro had a condensed milk plant, a hat factory, a textile and woolen mill, a soap factory, a foundry, a furniture factory, and a feed and flour mill.

Iron ore was discovered in Londonderry in 1844, and between 1876 and 1908 more than 798 000 tonnes of iron were produced. Gold was mined at Brookfield between 1887 and 1938 and at Gays River from 1873 to 1901 (Creighton 1979). Brookfield produced nearly 3.2 million tonnes of limestone between 1873 and 1975.

By the turn of the century, shipbuilding was in decline and agricultural activity had reached its peak. In the early 1900s the primary industries continued to be agriculture, fishing, lumbering, and mining with manufacturing and transportation the prime activities in Truro. The depression of the 1930s severely affected the economy of Colchester County, and prices for its produce dropped drastically.

The advent of World War II had a stimulating effect on the economy of the county through the construction of the airport and military camp at Debert. Colchester's production of agricultural and forestry products saw a strong resurgence in response to the increased demand of the 1940s. Economic improvement in Colchester County carried over into the 1950s where lumbering and farming remained the principal occupations of most rural residents.

Rapid expansion in manufacturing and service industries characterized the 1960s and 1970s; however, agriculture continued to be the dominant industry for much of rural Colchester County.

## Population and industry

In 1986 the population of Colchester County was 45 093 (Nova Scotia Department of Development 1989). The principal centres are the towns of Truro (population 12 124) and Stewiacke (pop. 1265), the villages of Bible Hill (pop. 4634), and Tatamagouche (pop. 711), as well as a number of unincorporated settlements.

Such communities, with populations of more than 500, are Brookfield (pop. 989), Hilden (pop. 1421), Valley Cross Roads (pop. 566), Truro Heights (pop. 1005), Great Village (pop. 620), Masstown (pop. 527), Onslow Mountain (pop. 673), and Debert (pop. 732). In 1986, Colchester County had an urban population of 19 976, which represented 44.3% of the total. The remaining 25 117 (55.7%) represented the rural population, of which 1668 (3.7%) lived on farms (Nova Scotia Department of Development 1987).

Farming and forestry dominate the economy of the rural areas. A wide variety of crops are grown but the major proportion of cropland is devoted to forage crops, dairying, and beef production. Hardwood and softwood are cut for lumber, pulp, and firewood. Lumber is produced at numerous small sawmills in the county, whereas the pulpwood is processed at mills elsewhere in the province.

Mining in Colchester County is small-scale with mineral production limited to limestone at Brookfield and extraction of sand and gravel at Folly Lake, Belmont, and Earltown.

The fishing industry is limited to lobster fishing concentrated at Tatamagouche and commercial clam digging centred on the Economy shore.

Most manufacturing activity is located near Truro, where the largest single employer is the Stanfield knitting mill. Other major employers are the carpet, textile, cement, and dairy product industries. Other manufactured items include electrical equipment, wine, furniture, lumber, preserved wood, processed food, and animal feed.

## Transportation

Colchester County has a total of 1857 km of highway, 59% of which are paved.

The Trans-Canada Highway (TCH), route 104, runs through the centre of the County connecting Truro to New Brunswick to the west and Cape Breton to the east (Fig. 2). The province's other major highway, route 102, connects Halifax with the TCH at a junction just north of Truro.

The Canadian National Railway (CNR) main line from Montreal to Halifax passes through Truro and provides daily freight and passenger service. Truro is the junction for a CNR branch line to Sydney and the ferry service to Newfoundland.

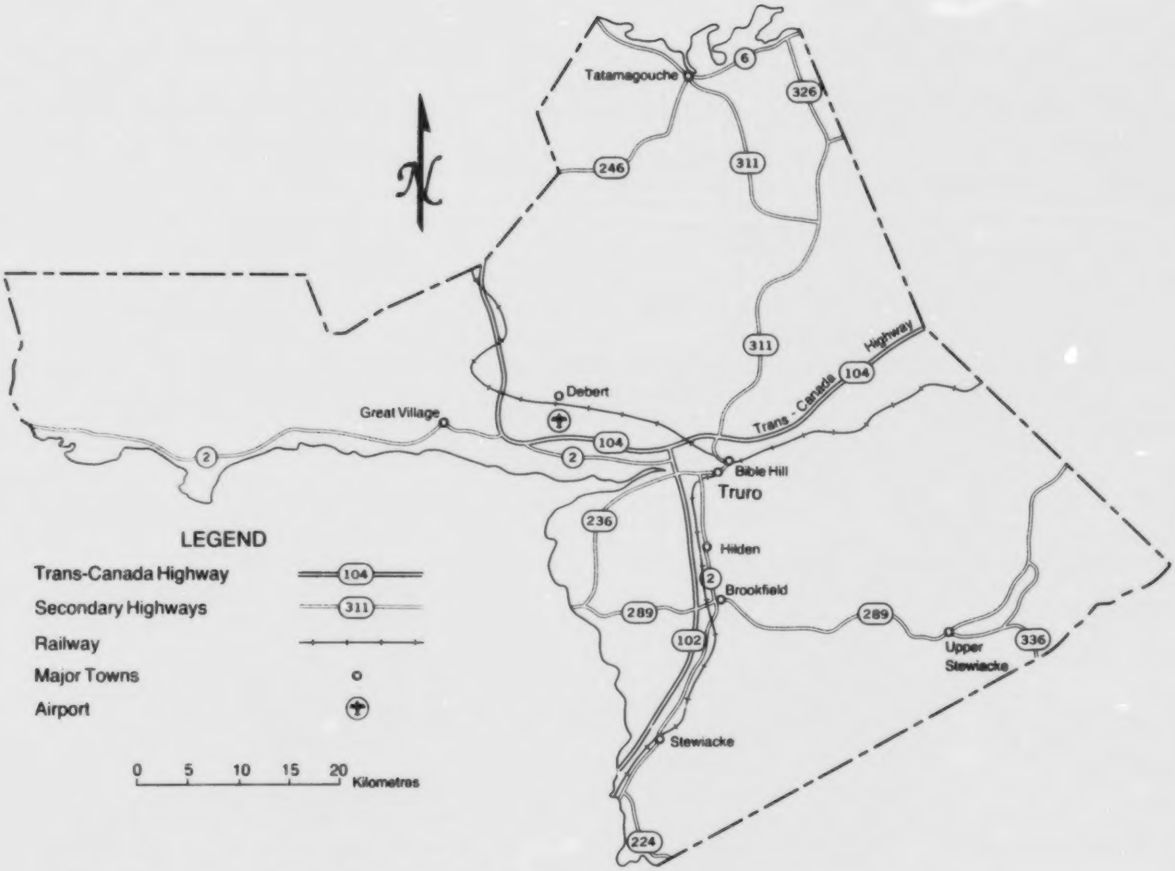

Tatamagouche
6
326
246
311
311
Trans - Canada Highway
104
Debert
Great Village
2
104
2
Bible Hill
Truro
236
Hilden
2
Brookfield
289
289
102
Upper Stewiacke
336
Stewiacke
224
N
LEGEND
Trans-Canada Highway
104
Secondary Highways
311
Railway
Major Towns
Airport
0 5 10 15 20 Kilometres

Fig. 2. Location of towns and transportation routes.

Airport facilities are operated for small, private planes at Debert. Colchester County has no ports suitable for handling large ocean-going vessels.

## Glaciation

Ice sheets completely covered Nova Scotia during the Late Wisconsin glaciation, which ended about 12 000 years ago. Local ice caps probably covered the higher areas of Nova Scotia during both the earlier and later stages of this glaciation (Prest and Grant 1969). Ice caps would have occurred in the Cobequids, in the higher areas of Pictou and Antigonish counties, and on the plateau of northern Cape Breton. Glacial action appears to have been light in these areas, perhaps because of thinner ice cover over the higher ground, or because these areas were protected by early snow cover (Roland 1982). Moving glaciers appear to have transported eroded materials only for a short time as the composition of the glacial debris is similar to that of the underlying bedrock (Cameron 1965).

During recession of the glaciers there was more local ice movement in Nova Scotia and glacial features indicate changes in ice flow direction in response to topography, climatic change, and sea level rise (Prest and Grant 1969).

The pattern of glacial movement north of the Cobequid Upland is somewhat irregular and confusing. It appears that for some time the Cobequids deflected the southward movement of ice westward through Chignecto Bay and eastward into Pictou County. Rocks originating from the Cobequids are commonly found in the glacial drift as far east as Pictou and Pictou Island. South of the Cobequids, glacial striae, glacial drift, and the orientation of drumlins indicate a general southeasterly movement of the ice (Roland 1982).

As the glaciers receded to localized ice caps at higher elevations, meltwaters carried large volumes of material downslope until the waters slowed on the plains below. Significant deposits of glaciofluvial outwash from these upland areas are found near the mouths and along the lower reaches of the Five Islands, Economy, Portapique, Folly, Debert, North, and Salmon rivers, to the south of the Cobequids. Small deposits of these materials are found north of the Cobequids on the Northumberland Lowlands.

## Physiography and geology

Colchester County can be divided into five physiographic zones (Roland 1982): the Cobequid Upland, the Northumberland Lowlands, the Minas Lowlands, the Horton Highlands, and the Southern Upland (Fig. 3). On the map Physiographic Regions of Canada (Geological Survey of Canada 1970), the Cobequid Upland is part of the Nova Scotia Highlands, the Northumberland Lowlands are part of the Maritime Plain, the Minas Lowlands are part of the Annapolis Lowlands, and the Horton Highlands and Southern Upland are parts of the Atlantic Uplands.

### Cobequid Upland

The Cobequid Upland extends in an east-west band across the northern part of the county. This remnant of an ancient Atlantic peneplain forms a narrow plateau with a rolling summit of fairly uniform elevation of about 275 m throughout its length, although isolated knolls are somewhat higher. Nuttby Mountain rises to more than 366 m. The prominence of the Cobequid Upland results from the resistance of its igneous and metamorphic rocks to the erosion that produced the adjacent Minas and Northumberland lowlands. Granite and related plutonics are the predominant igneous rock type found in the Cobequid Upland of Colchester County, followed by basalt, rhyolite, and felsic tuffs of Devonian and Silurian age. Folded sedimentary rocks of the same age are present in the Falls and Nuttby formations and Arisaig geological group (Fig. 4).

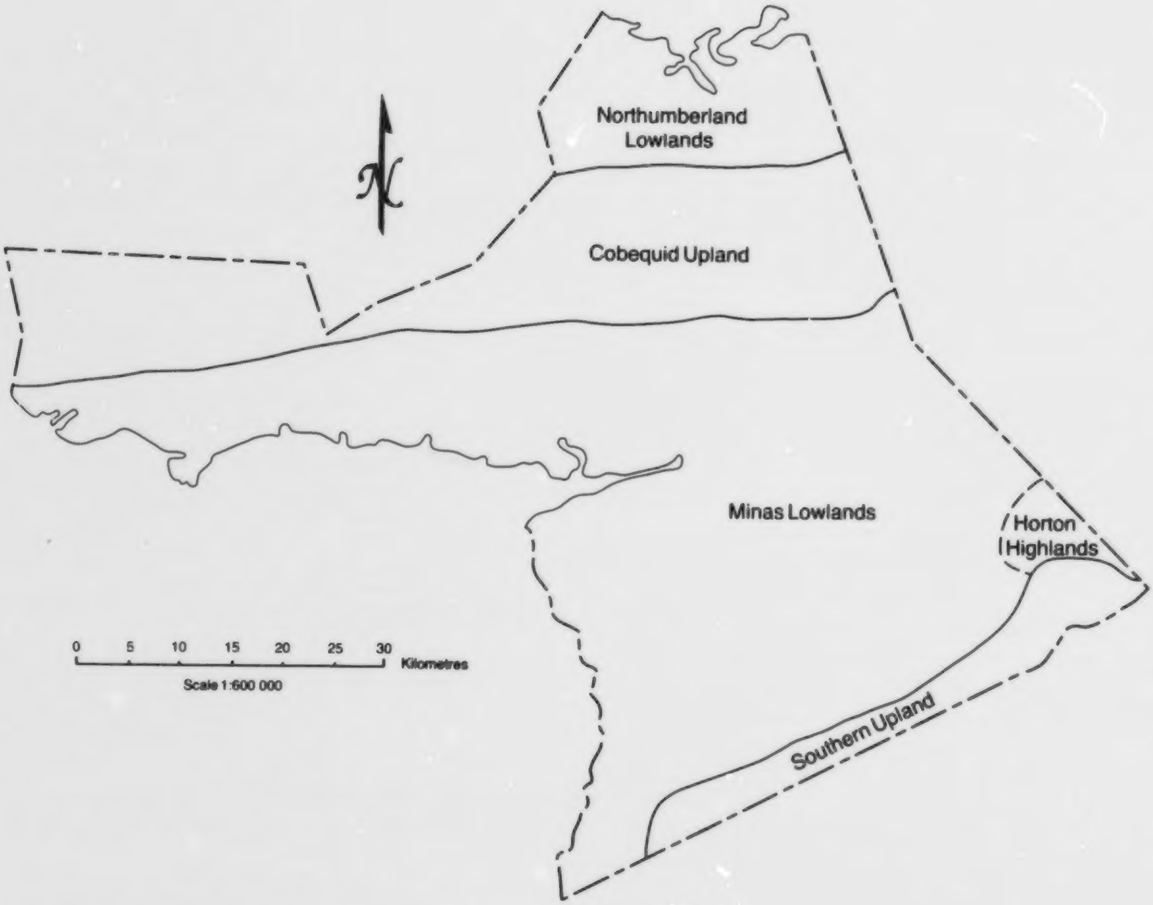
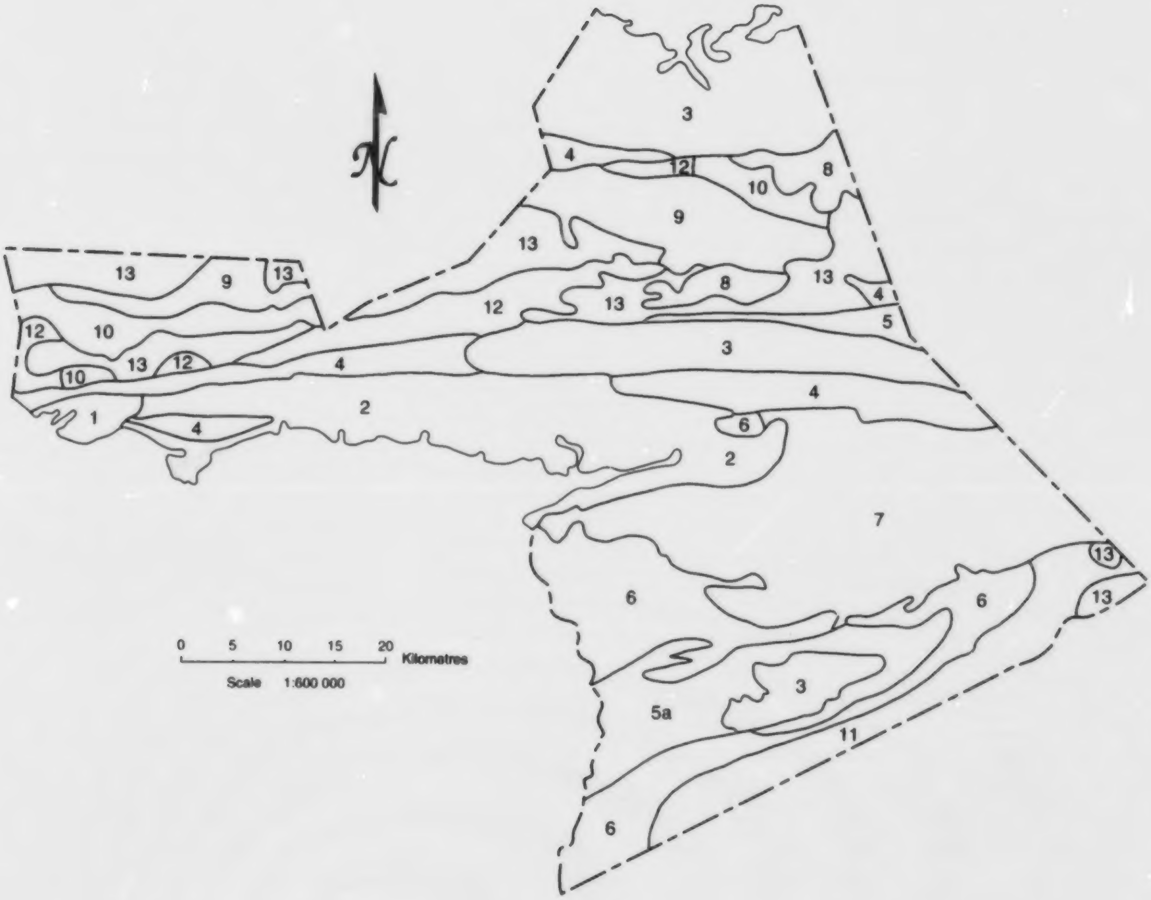

Northumberland Lowlands
Cobequid Upland
Minas Lowlands
Horton Highlands
Southern Upland
N
0 5 10 15 20 25 30 Kilometres
Scale 1:600 000

Fig. 3. Physiographic zones of Colchester County (Roland 1982).

Shallow stony tills predominate in the Cobequid Upland and rock outcrops are common. The till landforms are strongly controlled by bedrock and conform closely to the underlying strata. Slopes are complex but gentle across the top of the Cobequid Upland and moderate to strong in the incised valleys and on the mountain sides as they grade to the surrounding lowlands. Till deposits on the Cobequids are generally moderately coarse-textured, porous and contain numerous rock fragments derived from the local bedrock. Glaciofluvial sand and gravel deposits cover extensive areas near Simpson Lake to the west and through the Waughs and Salmon River valleys near Earltown to the east.



**LEGEND**

JURASSIC-TRIASSIC

1 Fundy Group: wacke, siltstone, basalt.
2 Undivided LATE TRIASSIC: siltstone, wacke, conglomerate.

LATE CARBONIFEROUS

3 Pictou-Stellarton Groups: sandstone, shale, conglomerate.
4 Riversdale Group: arenite, siltstone, shale, conglomerate.

EARLY CARBONIFEROUS

5 Canso Group: wacke, shale, conglomerate.
5a Canso Group - Watering Brook Formation: mudstone, shale, gypsum, anhydrite, halite.
6 Windsor Group: sandstone, shale, gypsum, limestone, mudstone, conglomerate.
7 Horton Group: sandstone, shale, siltstone, conglomerate.

DEVONIAN

8 Falls and Nuttby formations: conglomerate, wacke, siltstone, arenite.
9 Fountain Lake Group: siltstone, wacke, basalt, rhyolite and dacite flows and tuffs.

SILURIAN

10 Wilson Brook and Earltown formations: shale, wacke, rhyolite, basalt, felsic tuff.

CAMBRIAN

11 Meguma Group: slate, siltstone, graywacke.

PRECAMBRIAN

12 Undifferentiated PRECAMBRIAN: schist, gneiss, quartzite, meta-volcanic rocks, tuff.
13 Plutonic rocks of unknown age: granite.

Fig. 4. Generalized geological formations (modified after Keppie 1979).

### Northumberland Lowlands

The Northumberland Lowlands of Colchester County extend from the shore of Northumberland Strait south to the northern edge of the Cobequid Upland. The lowlands are underlain by Carboniferous sedimentary bedrock and slope generally upwards from sea level to about 100 m where they abut on the lower slopes of the Cobequid Upland. The sedimentary strata contain many minor folds, which extend in an east-west direction. Differential erosion of the harder sandstone and softer shale strata has formed ridges and valleys that are oriented similarly to the folds. Long, smooth ridges trending east and west swell and sag where the anticlinal axes of the underlying bedrock rise and fall.

Two major rivers drain the lowlands (Fig. 5); the French and Waughs cut across the ridges as they flow from their headwaters in the Cobequids, north to Northumberland Strait. On the lowlands they are joined at right angles by tributaries that meander parallel to the east-west trending topography. A combination of gentle topography and slowly permeable surficial till deposits has restricted drainage on the lowlands. Wetlands and organic soils are commonly associated with poorly drained depressions and slowly meandering streams.

A gently undulating to gently rolling till plain is the dominant landform of the lowlands. Where the deep tills are derived principally from shale or siltstone, they are medium- to moderately fine-textured; where they are derived primarily from sandstone or conglomerate, they are moderately coarse-textured. Irrespective of texture, the tills are dense and slowly permeable.

### Minas Lowlands

The Minas Lowlands are the most extensive physiographic zone in Colchester County (see Fig. 3). They extend from the southern edge of the Cobequid Upland south to the Southern Upland and from the Pictou County border west to Hants County and Cobequid Bay. The lowlands rise gradually in elevation from sea level along Cobequid Bay to more than 225 m above sea level near the Pictou County border, where they form a poorly defined boundary with the Horton Highlands and the eastern rim of the Pictou Basin, an inland extension of the Northumberland Lowland in Pictou County. The Minas Lowlands are drained by the Shubenacadie and Stewiacke rivers in the south, by the Salmon and North rivers in the east, and by the Bass, Portapique, Great Village, Folly, Debert, and Chiganois rivers in the west, all of which empty into Cobequid Bay (see Fig. 5).

The degree of resistance to erosion of the underlying geological formations accounts for the wide range in elevation found on the lowlands. Surrounding Cobequid Bay, from sea level to about 120 m, lies a band of soft Triassic sedimentary bedrock, underlying gently undulating till plain. The till deposits are deep and moderately coarse-textured, have low gravel content, and have a wide range in permeability.

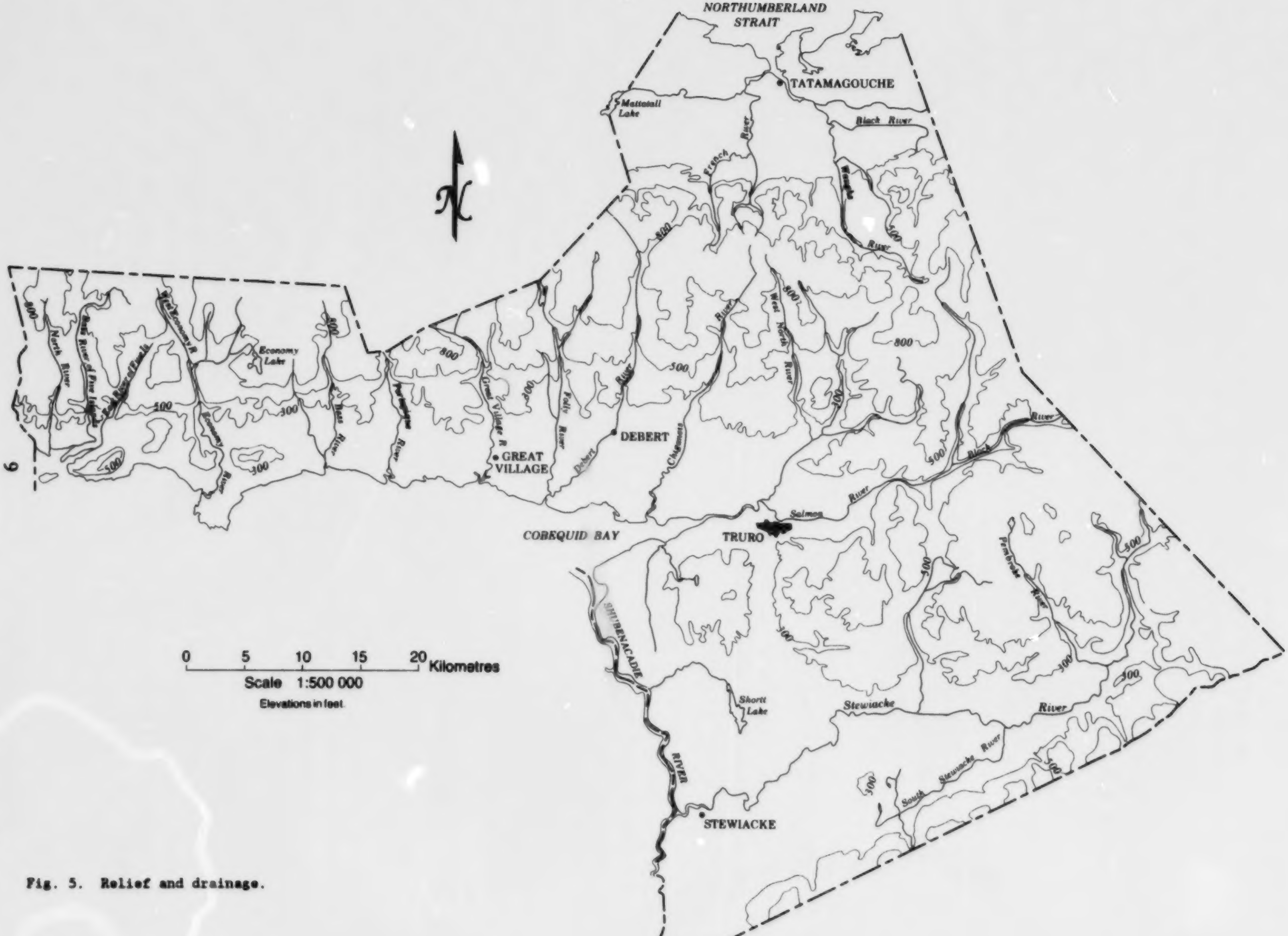

NORTHUMBERLAND STRAIT
TATAMAGOUCHE
Mattatall Lake
French River
Black River
Waugh River
West North River
Economy Lake
North River
Bass River of Five Islands
West Economy R.
Economy River
Bass River
Portapique River
Great Village R.
GREAT VILLAGE
Folly River
Debert River
DEBERT
Chiganois River
Salmon River
TRURO
COBEQUID BAY
Pembroke River
SHUBENACADIE RIVER
Shortt Lake
Stewiacke River
South Stewiacke River
STEWIACKE
800
500
300
0 5 10 15 20 Kilometres
Scale 1:500 000
Elevations in feet.

Fig. 5. Relief and drainage.

Both glacial and more recent fluvial processes have shaped the landscape of the Triassic portion of the lowlands. Coarse-textured glaciofluvial deposits washed southwards from the Cobequid Upland have been deposited along the lower reaches and at the mouths of many of the rivers that drain the northern portion of the Minas Lowlands. Tides in the Bay of Fundy have further modified the mouths of many of these rivers, forming marshlands composed of medium- and moderately fine-textured marine sediments.

Carboniferous bedrock underlies the remaining portion of the Minas Lowlands and completely borders the Triassic formations on its inland edge.

The southern section of the lowlands, dominated by the Shubenacadie and Stewiacke valleys, has topography similar to the Triassic portion but is underlain by sedimentary bedrock of the Windsor, Canso, and Pictou-Stellarton groups (see Fig. 4). The dominant landform here is a gently undulating till plain. The till deposits are predominantly deep, medium- and moderately fine-textured, slightly to moderately stony, and slowly permeable.

Associated with the meandering path of the Stewiacke River are significant areas of alluvium, lacustrine, and glaciofluvial sediments and peat deposits.

North and east of the Triassic portion of the lowlands and northeast of the Stewiacke Valley, the Minas Lowlands increase in elevation eastwards, reaching their highest elevations near the Pictou County border. This elevated section is underlain by the relatively resistant Horton Group of sedimentary rocks. The dominant landform here is a gently rolling till plain, characterized by variable deposits that range in depth from less than 1 m to more than 2 m and in texture from medium to moderately coarse. These tills are also moderately to very stony and bedrock outcrops are not uncommon.

## Horton Highlands

The Horton Highlands, located near the western tip of the county (see Fig. 3), represent the western end of the highlands that extend across southern Pictou County. The delineation between the adjacent elevated portion of the Minas Lowlands to the northwest and the Horton Highlands is not well defined, as both have similar elevations and landform. The Horton Highlands are underlain by Early Carboniferous sedimentary bedrock of the Horton Group. The rocks of this group are hard and have generally resisted extensive erosion during glaciation. This characteristic is most apparent in the Horton Highlands of Colchester County where bedrock commonly outcrops. The predominating landform in the Horton Highlands is a gently to moderately rolling till plain. The till is typically shallow, very to exceedingly stony, and of moderately coarse texture.

## Southern Upland

The Southern Upland in Colchester County runs parallel to the southwestern border of the county in a strip about 3 km wide. It constitutes the northern flank of Wittenburg Mountain, a high, narrow ridge that separates the Stewiacke Valley from the Musquodoboit Valley to the southeast. The ridge has a uniform elevation of about 165 m; has steep, dissected sides; and is underlain by Cambrian slates, siltstone, and greywacke of the Meguma Group (see Fig. 4). The dominant landform is a rolling till veneer commonly interrupted by bedrock outcrops. The till is typically shallow, moderately to very stony, and of medium to moderately coarse texture.

## Climate

Colchester County is located within a cool, humid, temperate climatic zone. This zone is influenced strongly by prevailing westerly winds that cause many of the low-pressure weather systems moving across North America to pass over Atlantic Canada. The frequent passage of bad weather associated with these low-pressure systems, and its maritime location, provide Colchester County with ample precipitation.

Colchester County experiences a modified continental climate, which displays great variability in all seasons. This variability is produced by the continual interaction of continental and maritime air masses. Because most of the weather systems originate in the interior, the continental influence often dominates the maritime influence. The continental influence on the region causes a wide range in annual temperatures. As a result the mean annual temperature range in the county is double that of the Pacific coast. Continental influence is felt in the warm, high-pressure spell in summer and the cold, clear period in winter. Winters are cold with frequent snowfalls and often kill forage and winter cereal crops. Springs are late, cool, and cloudy; summers are warm and quite humid.

The ocean, by supplying heat when it is cold and cooling when it is warm, moderates the climate, which reduces the temperature range in coastal areas. Most coastal areas of Nova Scotia have milder winters, cooler summers, and longer frost-free periods than interior locations. However, the benefit of an extended growing season in these coastal areas is offset by cooler summer temperatures and fewer growing degree days (GDD) for plant growth (Dzikowski 1983).

The Northumberland shore is an exception, because the waters of Northumberland Strait warm more during summer than deeper, less sheltered coastal waters. Thus the moderating influence in summer is less, which keeps air temperatures warm and enhances the warming influence during the fall. The shore area experiences growing degree days comparable to the Annapolis Valley. In winter the ice-covered strait has little influence in moderating air temperatures and also delays spring warming (Dzikowski 1983).

The climatic data for Tatamagouche and Stellarton-Lourdes in Pictou County are representative of the Northumberland Lowlands; data for Debert A, Truro, Nova Scotia Agricultural College (N.S.A.C.), and, further inland, Upper Stewiacke, are representative of the Minas Lowlands. Climatic data for Trafalgar in Pictou County are representative of the Horton Highlands located in the eastern corner of the county and can approximate the climate of the Wittenburg Mountain area, which represents the Southern Upland of Colchester. Although no climatic data are available for the Cobequid Upland, one can assume that because of their elevation, the climate would be similar to that of the Horton Highlands.

Total annual precipitation ranges from a low of 1058 mm at Tatamagouche on the Northumberland coast to a high of 1443 mm at Trafalgar in Pictou County (Table 1 and Fig. 6a).

**Table 1. Monthly temperature and precipitation data for representative stations**

| Mean data | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tatamagouche** | | | | | | | | | | | | | |
| Daily temp.($^0$C) | -6.3 | -6.5 | -2.3 | 3.1 | 9.3 | 15.6 | 19.2 | 18.6 | 14.4 | 9.0 | 3.8 | -3.1 | 6.2 |
| Snowfall (cm) | 58.3 | 53.2 | 58.6 | 17.6 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 6.0 | 47.2 | 244.1 |
| Total precip.(mm) | 97.7 | 97.0 | 82.2 | 79.8 | 71.9 | 76.9 | 82.2 | 70.8 | 74.9 | 99.7 | 116.1 | 108.9 | 1058.1 |
| **Debert A** | | | | | | | | | | | | | |
| Daily temp.($^0$C) | -6.7 | -6.9 | -2.3 | 3.5 | 9.3 | 15.0 | 18.3 | 17.7 | 13.4 | 8.0 | 3.1 | -3.5 | 5.7 |
| Snowfall (cm) | 37.7 | 42.4 | 40.9 | 23.2 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 12.3 | 46.5 | 208.0 |
| Total precip.(mm) | 103.2 | 101.8 | 88.3 | 98.6 | 83.4 | 99.9 | 82.5 | 132.9 | 113.0 | 119.0 | 148.4 | 125.2 | 1296.2 |
| **Truro, N.S.A.C.** | | | | | | | | | | | | | |
| Daily temp.($^0$C) | -6.0 | -6.2 | -1.7 | 3.8 | 9.3 | 15.0 | 18.4 | 17.8 | 13.8 | 8.5 | 3.7 | -2.8 | 6.1 |
| Snowfall (cm) | 43.7 | 45.4 | 35.8 | 14.4 | 1.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 8.7 | 40.2 | 190.5 |
| Total precip.(mm) | 105.6 | 96.0 | 82.3 | 84.6 | 78.5 | 64.1 | 70.8 | 106.6 | 87.4 | 107.9 | 135.0 | 124.2 | 1143.0 |
| **Upper Stewiacke** | | | | | | | | | | | | | |
| Daily temp.($^0$C) | -6.0 | -6.0 | -1.6 | 3.7 | 9.2 | 14.6 | 18.2 | 17.6 | 13.4 | 8.3 | 3.6 | -3.1 | 6.0 |
| Snowfall (cm) | 32.3 | 37.3 | 28.9 | 8.5 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 6.6 | 28.9 | 144.9 |
| Total precip.(mm) | 114.4 | 99.7 | 94.4 | 81.6 | 85.3 | 76.4 | 91.1 | 97.2 | 85.0 | 105.3 | 127.0 | 125.1 | 1182.5 |
| **Trafalgar** | | | | | | | | | | | | | |
| Daily temp.($^0$C) | -7.3 | -7.8 | -3.3 | 2.4 | 8.1 | 14.0 | 17.4 | 16.8 | 12.4 | 7.3 | 2.4 | -4.2 | 4.9 |
| Snowfall (cm) | 61.7 | 64.4 | 56.7 | 23.9 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 3.3 | 15.4 | 56.2 | 284.2 |
| Total precip.(mm) | 149.8 | 126.9 | 125.5 | 97.0 | 100.4 | 91.9 | 94.3 | 103.2 | 93.1 | 132.5 | 163.9 | 164.0 | 1442.5 |

Source: Atmospheric Environment Service 1980.

Average snowfall amounts range from 144 cm at Upper Stewiacke to 284 cm at Trafalgar. Mean July temperatures range from a low of 17.4°C at Trafalgar to a high of 19.2°C at Tatamagouche. Mean January temperatures range from a low of -7.3° C at Trafalgar to a high of -6.0° C at Truro and Upper Stewiacke.

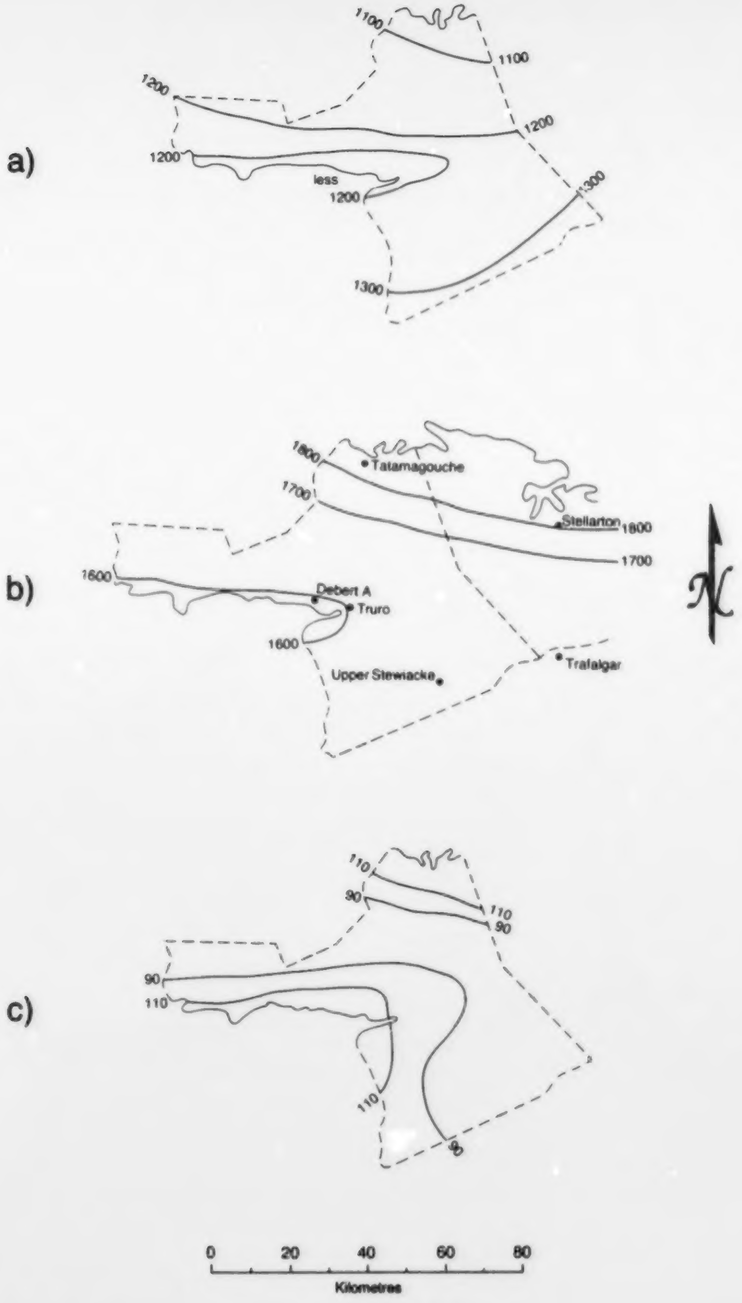

a)
1100
1100
1200
1200
1200
less
1200
1300
1300
b)
1800
Tatamagouche
1700
Stellarton
1800
1700
1600
Debert A
Truro
1600
Upper Stewiacke
Trafalgar
N
c)
110
90
110
90
90
110
110
90
0
20
40
60
80
Kilometres

Fig. 6. Climatic data for Colchester County (from Dzikowski 1983): (a) annual total precipitation (mm); (b) annual total degree days above 5°C; and (c) average frost-free period (days).

Fogs are common along the coastal areas of the county, particularly along the Bay of Fundy shore. Coastal areas take the brunt of the winds, which are commonly from the west and northwest in winter. Northwesterlies in spring are frequently responsible for delayed plant growth along the Northumberland shore, and all year they are often twice as strong on the shore as at points inland (Nowland and MacDougall 1973).

An indication of the length of the growing season for most crops is given by the average number of degree days above 5°C; in Colchester County this figure ranges from 1600 to 1800 GDD (Fig. 6b), which is comparable with the Prairies but is 700-900 GDD fewer than southern Ontario.

For practical purposes, the length of the growing season is governed by the occurrence of the latest spring frost and the earliest fall frost. These average and extreme dates of frost and the average frost-free period for selected stations are shown in Table 2. Data are unavailable for Tatamagouche, therefore information from Stellarton-Lourdes, 53 km to the east in Pictou County, has been substituted to represent conditions on the Northumberland Lowlands. The average frost-free period is illustrated in Figure 6c.

Table 2. Average and extreme dates of frost and length of frost-free period at representative stations

| Station | Elevation (m) | Last frost in spring | | | Average frost-free period (days) | First frost in fall | | |
|---|---|---|---|---|---|---|---|---|
| | | Earliest | Average | Latest | | Earliest | Average | Latest |
| Debert A | 43 | May 14 | May 27 | June 15 | 118 | Sept 9 | Sept 23 | Oct 9 |
| Truro (N.S.A.C.) | 23 | May 12 | June 5 | July 9 | 104 | Aug 18 | Sept 18 | Oct 8 |
| Upper Stewiacke | 23 | May 12 | June 12 | July 8 | 86 | July 19 | Sept 7 | Oct 1 |
| Stellarton-Lourdes | 11 | May 5 | May 31 | June 14 | 112 | Sept 1 | Sept 21 | Oct 9 |
| Trafalgar | 152 | June 2 | June 21 | July 3 | 76 | Sept 1 | Sept 6 | Sept 14 |

Source: Hemmerick and Kendal 1972.

In Table 3, frost data for selected stations are expanded to show the calculated probability of frost occurrence after certain dates in the spring and before certain dates in the fall.

Table 3. Probability of frost occurrence at representative stations

| Station | Probability of last spring frost occurring on or after dates indicated (years) | | | | Probability of first fall frost occurring on or before dates indicated (years) | | | |
|---|---|---|---|---|---|---|---|---|
| | 3 in 4 | 1 in 2 | 1 in 4 | 1 in 10 | 1 in 10 | 1 in 4 | 1 in 2 | 3 in 4 |
| Debert A | May 19 | May 27 | June 5 | June 12 | Sept 10 | Sept 16 | Sept 23 | Sept 30 |
| Truro (N.S.A.C.) | May 31 | June 5 | June 11 | June 16 | Sept 4 | Sept 11 | Sept 18 | Sept 26 |
| Upper Stewiacke | June 6 | June 13 | June 19 | June 25 | Aug 18 | Aug 28 | Sept 7 | Sept 18 |
| Stellarton-Lourdes | May 19 | May 29 | June 9 | June 18 | Sept 3 | Sept 11 | Sept 14 | Sept 29 |

Source: Canada Department of Transport, Meteorological Branch 1968.

The depth to which frost penetrates the soil and its duration depend upon the amount and duration of snow cover, the texture and moisture content of the soil, and the type of vegetation cover. Well-drained forested soils can freeze to only 5 cm under substantial snow, or up to 90 cm when seasonal snowfall is well below average. Freezing is confined largely to the litter layer in poorly drained forest soils under average snowfall but can penetrate to a 30-cm depth for several weeks when snow cover is thin or intermittent. In cultivated soils frost can persist for 3 to 5 months in the plow layer. At a depth of 50 cm, it can last for only 1 month in poorly drained soils beneath snow, or 4 months in soil that is well drained and exposed (Nowland and MacDougall 1973).

## Vegetation

The natural vegetation of Colchester County is a product of its climate. However, some local variations are produced by topographic exposure and by depth, nutrient supply, and drainage status of the soils. Indigenous forest has been much altered by logging, land clearing for farming, and forest fires, until little undisturbed forest remains.

In 1986, forest covered 294 830 ha or 80% of the total area of the county. Of this total, 44% was softwood forest, 33% was mixed wood forest, and the remaining 23% was hardwood forest (Nova Scotia Department of Lands and Forests 1986).

Spruces and balsam fir are the most abundant softwood species and together constitute more than 96% of the total volume of softwood in the county; much smaller volumes of hemlock, pines, larch, and other softwoods occur in this order (botanical names are given in Appendix 1). Maples account for more than 70% of the total hardwood volume, followed by birches, beech, aspen, and other hardwoods (Table 4).

Table 4. Volumes of tree species

| Softwood species | Volume* (1000 $m^3$) | % of total | Hardwood species | Volume (1000 $m^3$) | % of total |
|---|---|---|---|---|---|
| White spruce | 1 362 | 5.1 | Sugar maple | 7 099 | 26.5 |
| Spruce (red, black) | 6 722 | 25.1 | Red maple | 1 965 | 7.3 |
| Balsam fir | 5 255 | 19.7 | Yellow birch | 2 431 | 9.1 |
| Hemlock | 292 | 1.1 | White birch | 150 | 0.6 |
| Pines | 93 | 0.3 | Beech | 459 | 1.7 |
| Larch | 84 | 0.3 | Aspen | 373 | 1.4 |
| Other softwoods | 16 | 0.1 | Other hardwoods | 442 | 1.7 |
| Total softwood | 13 824 | 51.7 | Total hardwood | 12 919 | 48.3 |
| Total forest volume | | | | 26 743 | 100 |

* $m^3$ x 0.4527 - cords.
Data from: Nova Scotia Department of Lands and Forests 1986.

In A forest classification for the Maritime Provinces Loucks (1961) classified units that correlate quite closely to the physiographic or landscape areas within the survey area. The Maritime Uplands Ecoregion of the Sugar Maple - Yellow Birch - Fir Zone is located on the Cobequid and Southern uplands. The Maritime Lowland Ecoregion of the Red Spruce - Hemlock - Pine Zone corresponds closely with the Northumberland and Minas lowlands and the Horton Highlands. The Fundy Bay Ecoregion of the Spruce - Fir Coastal Zone covers the small western portion of the county on the Minas Lowlands north of Minas Basin (Fig. 7).

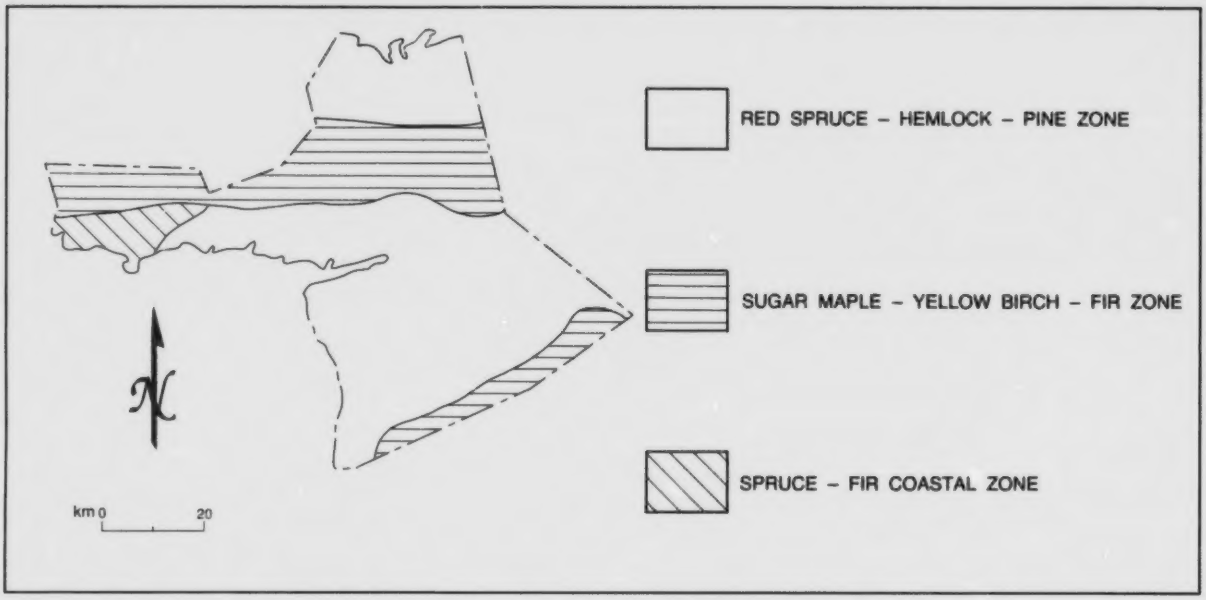

RED SPRUCE - HEMLOCK - PINE ZONE
SUGAR MAPLE - YELLOW BIRCH - FIR ZONE
SPRUCE - FIR COASTAL ZONE
N
km 0
20

Fig. 7. Forest vegetation zones of Colchester County (Loucks 1961).

The Cobequid and Southern uplands of Colchester County support hardwood, softwood, and mixed wood forest. Hardwood forest composed of sugar maple, yellow birch, and beech is most abundant on hills and freely drained upland sites. White spruce, red spruce, and balsam fir form mixed wood forest with sugar maple, yellow birch, and red maple on steep slopes. Balsam fir, black spruce, white spruce, and white pine predominate in the valley bottoms. On the Southern Upland red spruce, white spruce, balsam fir, and hemlock cover upland flats, lower slopes and valleys (Loucks 1961).

An important limiting factor to tree growth in the Cobequid Upland is exposure to winds and neither red spruce nor yellow birch grows well unless sheltered by more tolerant species. Although infertile, the stony soils of the Cobequids possess a slightly higher nutrient status than many soils in the county. This characteristic and the contribution of broadleaf litter to improving the availability of plant nutrients are at least partly responsible for luxuriant shrub growth in clearings and under the hardwoods (Nowland and MacDougall 1973). Competition from quick-growing mountain maple, beaked hazelnut, and hobblebush usually delays hardwood regeneration. Characteristic species of ground flora on the Maritime Upland Ecoregion are wood-sorrel, wood-fern, and shining club-moss. Blueberry is naturally uncommon but is cultivated on abandoned farm land.

The Northumberland and Minas lowlands support a distinctive association of red spruce, black spruce, balsam fir, red maple, hemlock, and white pine. Black spruce is the main species, and tamarack is prominent on large areas of poorly drained soils and on wetlands. Jack pine and red pine occur on droughty sands and gravels.

Strong winds along the Northumberland shore affect the forest vegetation, particularly the red spruce. Nevertheless, this species remains abundant, growing best where sheltered. White spruce is more tolerant of wind than red spruce, and, because it readily colonizes abandoned farm land, it is more plentiful along the coast. Regardless of species, second-growth stands on this area are stunted unless sheltered from the wind. Over much of the lowlands the moist and slowly permeable soils are significant factors affecting growth. This forest association exists on all types of topography except some drier, more exposed upper slopes, which support sugar maple, yellow birch, and beech forest. Red maple and wire birch predominate on old burns.

Abandoned farm land in Colchester County reverts to speckled alder shrubs and white spruce. Alders abound on imperfectly and poorly drained fields that have been neglected, and they choke disused tracks. White spruce thrives on imperfectly to moderately well-drained old fields, either as dense stands or in open competition with shrubs (Nowland and MacDougall 1973).

Prominent shrub and herb species of the Maritime Lowlands Ecoregion include witherod, rhodora, sheep-laurel, sweet-fern, wood-fern, Labrador-tea, and wild raspberry. Common smaller plants are teaberry, goldthread, naked miterwort, bunchberry, bristly club-moss, wood-sorrel, and sphagnum and feather mosses.

The Fundy Bay Ecoregion portion of the Minas Lowlands supports a stable association of red spruce, balsam fir, and red maple with scattered white spruce, white birch, and yellow birch (Loucks 1961). Hemlock and white pine occur only along the inland border of the ecoregion. Late springs, cold summers, and frequent fogs are characteristic climatic conditions for this coastal area. In exposed locations tree growth is retarded by strong coastal winds. Red spruce is the common species colonizing abandoned farmland.

Lesser vegetation of the Fundy Bay Ecoregion is distinguished by a number of species of boreal origin. Foxberry is found commonly on dry, rocky sites and cloudberry can be found on peat bogs. Mountain-ash and the boreal variety of wild raspberry are also found in this ecoregion (Loucks 1961).

## PART 2. SOIL FORMATION, CLASSIFICATION, SURVEY AND MAPPING METHODS

### Soil formation

Soil is defined as "the naturally occurring, unconsolidated mineral or organic material at least 10 cm thick that occurs at the earth's surface and is capable of supporting plant growth" (Agriculture Canada Expert Committee on Soil Survey 1987). Soils and the differences between them are produced by the interaction of several factors. The factors of soil formation are climate, organisms (including vegetation), topography, parent materials, and time.

#### Climatic factors

Climatic factors and microorganisms act upon rocks and parent materials to produce soils. Chemical reactions involved in this weathering process proceed more rapidly under warm, moist conditions. Rainfall, especially the amount that exceeds evapotranspiration, is important in determining how quickly the products of weathering, including plant nutrients, are leached out of soils.

The moist, cool climate, by promoting rapid leaching of nutrients and slow replacement of freshly weathered products, is the basic reason for the acidity and infertility of the soils of Colchester County.

The effects of climate and vegetation are interwoven. Climate exerts strong control over vegetation; vegetation modifies the climate at ground level. Climatic factors are partly responsible for an accumulation of organic matter in the soil, because low temperatures during much of the year do not encourage rapid decomposition.

Plant nutrients, taken up at depth within the soil by plant roots, enrich the surface through litter fall. This cycling of nutrients from the soil to the vegetation and back again counters nutrient loss from soil via leaching. Leaching ability, which is governed by the litter, is highest under coniferous and moss litter, somewhat less under hardwoods, and least under grasses. The litter cover also protects the soil from erosion.

#### Organisms

Organic matter thoroughly incorporated into the mineral soil can produce good structure, which provides the ideal combination of good moisture storage and rapid drainage of surplus water. Such conditions are approached under some deciduous trees and in surface soils under grass, where organic matter provides a source of nitrogen and a substrate for microorganisms. The microorganisms play a vital role in breaking down and in synthesizing readily available plant nutrients. The application of lime not only increases the availability of present nutrients but stimulates a vastly increased microbial population, which helps to release more nutrients.

Lime in combination with organic matter is necessary for a well-structured surface soil and deficiencies of one or the other are the cause of the weak structural aggregation of most cultivated soils in the province.

Coniferous trees drop a needle litter that is not readily digested by most microorganisms, so it decomposes slowly and accumulates on the soil surface. The primary decomposers of coniferous forest litter are fungal organisms. The decomposition by-products are strongly acid and usually create an adverse environment also for earthworms and arthropods. Thus little of this raw humus, or mor as it is called, is mixed with the mineral soil. Infiltrating water is made more acidic by its reaction with the by-products of fungal decomposition. The resultant soil solution readily leaches out plant nutrients and other bases.

The litter from hardwood trees is more readily digested by soil microorganisms and is usually higher in nutrients than conifer litter. As a result, hardwood litter is more easily decomposed and incorporated into the mineral soil forming partly decomposed humus called moder. Under less acid, more nutrient-rich soil conditions, hardwood litter is consumed and incorporated into the mineral soil very quickly by earthworm activity, producing intimately mixed, humified humus called mull.

### Topography

The influence of topography is threefold. With increasing elevation, annual temperature decreases and annual precipitation increases, which, unless countered by other factors, cause greater leaching of upland soils. Aspect, or orientation of a slope in relationship to the warming rays of the sun, affects biological activity and the rate of mineral weathering.

Water collects on level areas and is shed by slopes. On level areas, the degree of gleying or intense leaching, or both, depends on the permeability of the soil and the depth of groundwater. On slopes, even permeable soils are less well developed, because a higher proportion of rainfall is lost as runoff. Such water is not available for leaching but can erode the surface and keep the soil immature and often shallow.

### Parent material

Parent material determines the mineral content and, to a large extent, the texture of the soil. It partly governs soil fertility, internal drainage conditions, and color. Physical and chemical weathering together transform rocks into unconsolidated material. Further alteration of minerals and the formation of secondary clay minerals rely increasingly on chemical processes. These processes proceed more rapidly in parent material containing high proportions of less resistant minerals such as the ferromagnesian minerals. Where resistant quartz and orthoclase feldspar are dominant, the soil usually has a fairly coarse texture. In all soils, much depends on whether products of decomposition remain in the soil or are removed in drainage water.

## Time

The rate of weathering is highly variable and thus soil formation depends on time. Given time, even resistant minerals break down and soil may develop to great depth. Soils in the surveyed area have developed over the relatively short span of 10 000 years, since the last glaciation. Much initial weathering from rock to unconsolidated material occurred rapidly by glacial action, or by extended preglacial and interglacial weathering under favorable warm, humid conditions. Intense leaching since the last Ice Age has produced fairly mature soils.

The most immature soils in the county are those forming on recent alluvial deposits. These deposits periodically receive fresh material from flooding and remain at a young stage of development (Nowland and MacDougall 1973).

## Soil horizons

One important visual indication of soil formation is the development of one or more layers called horizons that extend from the soil surface into the parent material.

A cut or exposure showing the vertical sequence of soil horizons is called a soil profile (Fig. 8). No soil contains all these horizons, but every soil has some of them.

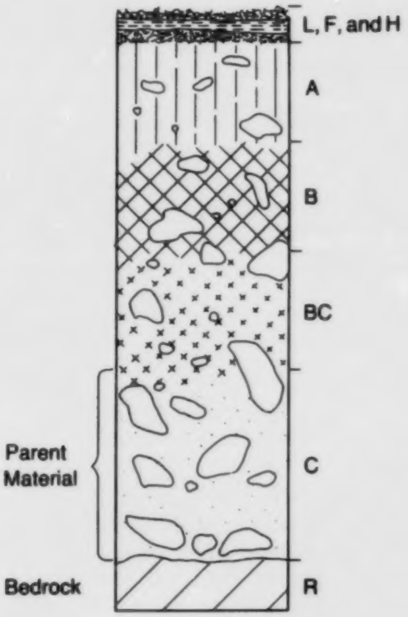


Fig. 8. Hypothetical soil profile.

Each soil has a unique profile that varies in the kind and number of horizons. The horizons may differ from each other in one or more of the following characteristics: color, structure, texture, consistence, reaction, thickness, and in chemical and biological composition. The main soil horizons are designated as A, B, and C for mineral horizons and L, F, H, and O for organic horizons, The characters of these horizons are shown by lower-case suffixes (e.g., Bf); subdivisions of these are shown by attaching Arabic numerals (e.g., Bf1, Bf2). See Agriculture Canada Expert Committee on Soil Survey (1987) for detailed description of the main horizons and the use of the lower-case suffixes and numerals.

L, F, and H. In these organic horizons the organic matter is raw in L, partly decomposed in F, and well decomposed in H.

A. This mineral horizon is at or near the surface. It may be dark brown because of an accumulation of humus (Ah) or gray when clay, iron, and humus have been leached out (Ae). It is usually the horizon most commonly disturbed by human activities, such as cultivation (Ap).

B. This mineral horizon is commonly found below an A horizon. It may be enriched with iron (Bf), with iron and organic matter (Bhf), or with clay (Bt). Where it is only weakly modified or enriched with iron, humus, or clay in amounts insufficient to be called a Bf, Bhf, or Bt, it is labeled a Bm. If saturated for extended period, B horizons show signs of gleying or mottling (Bfg, Btg, Bg). The symbol "j" is used with above suffixes (except "m") to denote a failure to meet the specified limits of the suffix.

BC. This transitional horizon may be gleyed to various degrees (BCg, BCgj) or cemented by the development of a fragipan (BCx, BCxj).

C. This mineral horizon is relatively unaffected by the soil-forming processes that occur in the A and B horizons except for fragipan development and gleying (Cx, Cg).

R. The underlying bedrock may be close to the surface or many metres below it.

## Soil-forming processes

Several processes take place in the formation of soil horizons:

Accumulation of organic matter The L, F, and H horizons are organic accumulation of forest litter on the surface of the mineral soil. Under rapid decomposition by soil organisms organic matter can accumulate in the A horizon where most weathering takes place. The formation of Ah horizons commonly occurs in soils under hardwood vegetation in the Cobequid Upland.

Leaching of bases The intensity of mineral weathering is greatest in the A horizon. Bases are released from minerals that are fragmented by weathering processes. Once released to the soil solution, bases are free to be removed by percolating soil water and are leached from the A horizon. The leaching of bases precedes the translocation of silicate clay minerals, sesquioxides, and organic matter. Leaching is a prominent soil process occurring in most of the Colchester County soils.

Translocation of silicate clay minerals, sesquioxides, and organic matter Material weathered and leached from the A horizon is deposited in the B horizon. If the amount of clay translocated to the B horizon is significantly greater than the amount in the A horizon, it is designated as a Bt horizon. The translocation of silicate clay minerals has contributed to the development of horizons in the Luvisols of which some Queens soils are examples. The Bt horizon of some of these soils show clay accumulation as thin films on ped surfaces and in pores.

The removal of iron and organic matter from the A horizon is usually characterized by a gray- to whitish-colored siliceous Ae horizon.

The deposition of significant amounts of iron plus aluminum and organic matter is shown by the addition of the suffixes of f and h to the B horizon. This depositional process is called podzolization and is the predominant soil-forming process in Colchester County; most of the well- to imperfectly drained soils are classified as Podzols.

Reduction and transfer of iron This process is the result of poor aeration and restricted oxidation and is called gleying. It is indicated by dull, grayish colors or mottling in the horizons, or both. The reddish or yellowish brown mottles in some horizons indicate the segregation of iron by periodic oxidation and reduction in the soil. Gleying is usually most pronounced in poorly drained soils and less pronounced in imperfectly drained soils.

Gleysols are wet soils in which the process of reduction and gleying are strongly expressed.

Other soil characteristics

Important features of soils are color, texture, structure, consistence, and reaction. Color is easily determined and described by using Munsell soil color notations. The range and kinds of colors in soil horizons are usually good indications of organic matter content, drainage, aeration, iron content, and leaching effects. Imperfectly and poorly drained soils are usually mottled with shades of gray, orange, and yellow.

**Soil texture** refers to the proportions of sand, silt, and clay less than 2 mm in diameter. When coarser soil particles constitute more than 20% of the soil volume, the terms gravelly or very gravelly are used as modifiers of the textural class name. For example, a gravelly loam may have 7-27% clay, 28-50% silt, less than 15% sand by weight, and 20-50% by volume of coarse particles. Very gravelly soils have 50-90% coarse particles by volume. The texture of a soil horizon is considered to be its most nearly permanent feature.

**Soil structure** is the characteristic of a soil profile that most influences plant growth. The form, size, and durability of the soil aggregates determine pore space, moisture-holding capacity, and distribution of plant roots within the soil mass. A soil horizon may have granular, blocklike, or platelike structure, or it may be structureless (nonaggregated).

**Soil consistence** refers to the combination of properties of soil materials that determines the resistance to crushing and the ability to be molded or to be changed in shape. Consistence depends mainly on the forces of attraction between soil particles. Depending on the soil moisture content, consistence is described by such words as loose, friable, firm, soft, plastic, and sticky.

**Soil reaction** is expressed in pH values as a measure of the degree of acidity or alkalinity of a soil mass. It may range from extremely acid (below pH 4.5) to very strongly alkaline (pH 9.1 and higher). Neutral is regarded as being from pH 6.6 to 7.3.

Other soil features, which do not occur in all horizons, are as follows:

- thickness range
- abundance, size, distinctness, and kind of mottles
- percent volume of coarse fragments
- frequency, thickness, and location of clay films
- abundance of surface stones.

## Soil classification

Variations in the characteristics of the soil profile are the basis for soil classification. The soils of Colchester County represent six of the nine orders defined in The Canadian system of soil classification (Agriculture Canada Expert Committee on Soil Survey 1987). Each order represents broad differences in soil environments that are related to differences in the processes of soil formation. Usually orders are distinguished by common properties within the order that differ from properties of other orders. The six orders represented in Colchester County are Podzolic, Gleysolic, Luvisolic, Brunisolic, Regosolic, and Organic.

## Podzolic soils

Soils of the Podzolic order are rapidly to imperfectly drained and have developed under forest. If undisturbed, Podzols have surface organic horizons (LFH) that may be underlain by a Ah horizon. More commonly they have leached Ae horizons that may be either thick or very thin. The soils have Podzolic B horizons in which iron, aluminum, and organic matter have accumulated. Podzols are typically very acid. Podzols in Colchester County can be further subdivided into Humo-Ferric Podzols, which have Bf horizons and Ferro-Humic Podzols which Bhf horizons.

## Gleysolic soils

The soils of the Gleysolic order have developed under poorly drained, anaerobic or oxygen-deficient environments for extended periods throughout the year. They have developed under forest vegetation and may have surface layers of fibric peat up to 60 cm thick. The A and B horizons are dull colored and usually have prominent mottling within 50 cm of the surface. Three great groups exist in Colchester County: Gleysols; Humic Gleysols, which have an Ah at least 10 cm deep; and Luvic Gleysols, which have a Btg.

## Luvisolic soils

The soils of the Luvisolic order in Colchester County are imperfectly drained soils that have developed under forest vegetation on medium and moderately fine-textured till and lacustrine parent materials. They have surface organic horizons (LFH) underlain by weak, thin Ae horizons. Below the Ae horizon is a Bmgj horizon that overlays a Btgj horizon; the latter has translocated clay deposited as thin clay films on ped surfaces and faint mottling. Only the Gray Luvisol great group occurs in Colchester County.

## Brunisolic soils

The soils of the Brunisolic order are well to imperfectly drained and have developed under forest. These soils lack the degree and kind of development specified for soils of other orders, but have sufficient development to exclude them from the Regosolic order. Brunisolic soils have brownish Bm horizons and may have either an Ah or weakly to strongly developed Ae horizons. The order also includes soils with both Ae or Ah horizons, or both, and weakly expressed B horizons that have only weak accumulations of clay (Btj), or iron, aluminum, and organic compounds (Bfj), or both. Two great groups exist in Colchester County: Sombric Brunisols, which have an Ah; and Dystric Brunisols, which lack an Ah.

### Regosolic soils

The Regosolic order includes those soils with horizon development too weak to meet the requirements of other orders. In Colchester County these soils are well to imperfectly drained and have been prevented from maturing and developing B horizons by periodic flooding by river or tidal waters. Both the Regosol and Humic Regosol great group are present in the county.

### Organic soils

The Organic order includes those soils that have developed mainly from organic deposits. They contain greater than 30% organic matter and are usually saturated during most of the year. The Fibrisol and Mesisol great groups occur in the county.

Further subdivisions of the great groups into subgroups provides the most detailed level of soil classification used in describing the map units in this report. Subgroups are distinguished by the presence of certain diagnostic horizons. For further information on classifying soils at the subgroups level refer to The Canadian system of soil classification (Agriculture Canada Expert Committee on Soil Survey 1987).

## Survey methods

Black-and-white 1:50 000 aerial photographs and 1:50 000 topographic maps were used to locate and record soil inspections in the field. Soil survey crews traveled the county roads systematically stopping every 500-750 m to examine the soil. Four-wheel drive vehicles were used to access forest roads. At each site a soil pit or road cut was examined to a depth of about 1 m. The site and soil profile were described and documented using the standards and guidelines presented in the CanSIS Manual for describing soils in the field (Day 1983). Taxonomically the soils were classified according to The Canadian system of soil classification (Agriculture Canada Expert Committee on Soil Survey 1987).

Where roads are numerous, accessibility was good and soil observations were plentiful (Fig. 9). In these areas mapping reliability can be expected to be higher than in areas with few roads.

Soil map unit boundaries were drawn on the aerial photos in the field, where possible. However, because much of the area is forested, most soil boundaries were located using stereoscopic photo interpretation.

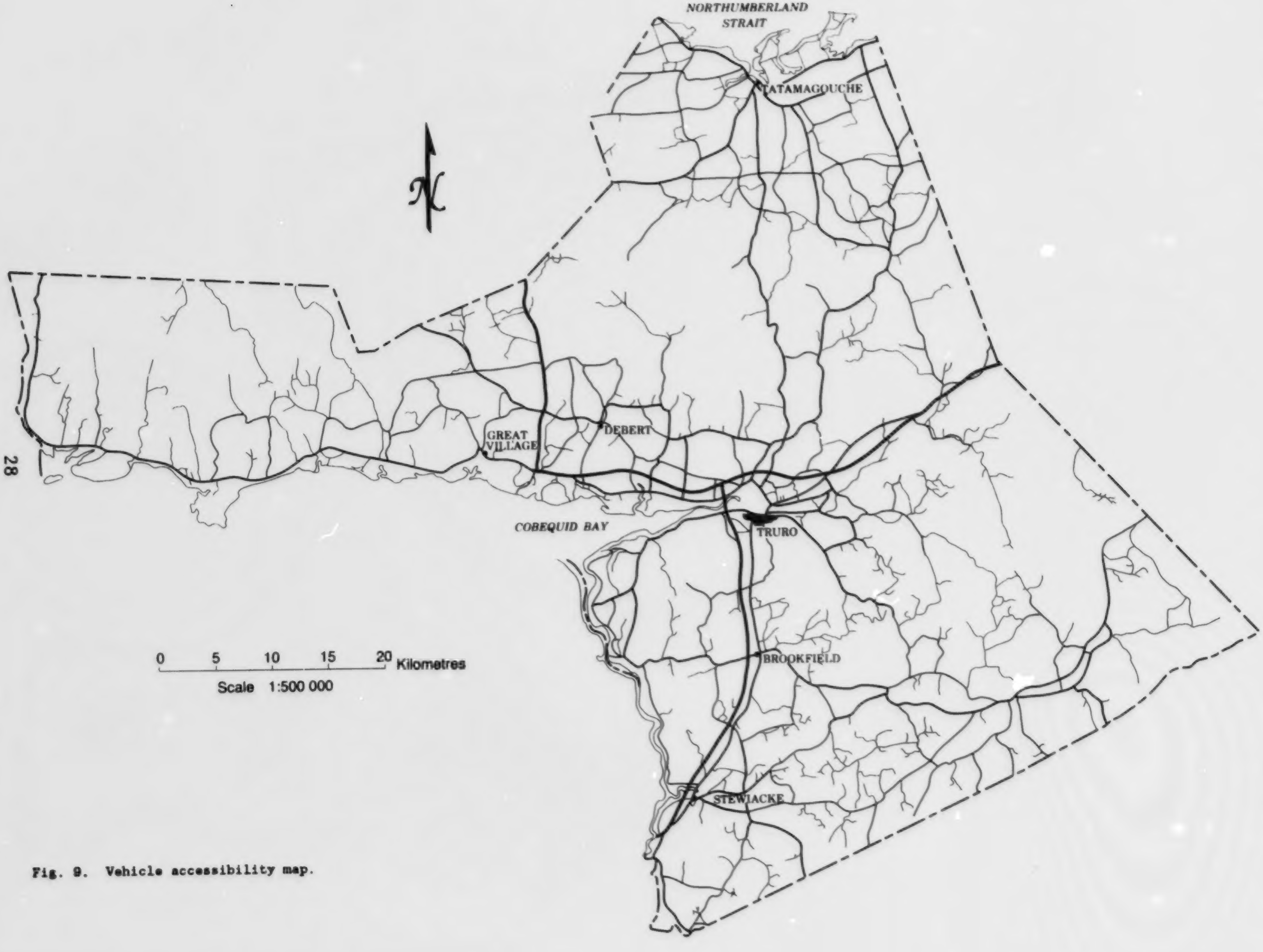

NORTHUMBERLAND
STRAIT
TATAMAGOUCHE
GREAT
VILLAGE
DEBERT
COBEQUID BAY
TRURO
BROOKFIELD
STEWIACKE
0
5
10
15
20
Kilometres
Scale 1:500 000

Fig. 9. Vehicle accessibility map.

All major soils were described, sampled, and analyzed. The methods used follow those found in the Manual on soil sampling and methods of analysis (McKeague 1978). The analytical method numbers from McKeague (1978) are indicated in parentheses:

- particle size analysis by the pipette method (2.11)
- pretreatments to remove organic matter, iron oxides, and carbonates (2.111)
- sieve analysis of dry soil (engineering test) (2.13)
- bulk density by the core method (2.21)
- moisture retention at 10, 30, and 300 kPa using pressure plate extraction and core samples (2.432)
- moisture retention at 1500 kPa using pressure membrane extraction (2.44)
- moisture retention using
- saturated hydraulic conductivity by the core method (2.51)
- liquid limit (2.61)
- plastic limit (2.62)
- plastic index (2.63)
- pH in $CaCl_2$ (3.11)
- pH in water (3.13)
- extractable Fe and Al by dithionite (3.51); by oxalate (3.52); by pyrophosphate (3.53)
- extractable Mn by dithionite (3.51)
- organic carbon by wet oxidation (3.613)
- total N (3.621).

The analytical soil data and corresponding profile descriptions are presented in Appendix 2, and the terms and abbreviations used there are defined in Appendix 3.

Engineering data and estimates of the Unified and AASHO classifications have been compiled for the soil parent materials and are presented in Table 4-3 of Appendix 4.

## Mapping methods

All individual soils described in the field have been grouped into 24 soil associations. A soil association includes all soils developed from similar parent materials. The origin, color, and textural range of the parent material of each soil belonging to a specific association must be similar. The soil association is usually named after the geographic location where it was first mapped. Many of the soil association names from the Soil survey of Colchester County (Wicklund and Smith 1948) have been used in this report, some have been dropped or combined, and some new associations have been created.

Within an association variations in soil drainage may alter the profile characteristics and limitations for use of the soil. Soils within an association having similar drainages are grouped into rapidly to well, well, or moderately well, imperfect, and poorly drained associates.

The soil associate is the basic mapping unit used in mapping the soils of Colchester County and has been used singly or in combination with other associates.

In simple map units only the dominant associate has been mapped; it occupies about 85% of the map unit. These units are numbered 1, 3, and 5 on the map and in the legend.

In the survey area, soil, drainage, and soil associations can change abruptly over very short distances within the landscape. In these complex areas compound map units are used to present a more accurate picture of the soil distribution. Compound map units are composed of a dominant associate component and a significant associate component. The dominant component occupies about 60% of the map unit and the significant component at least 25%. These units are numbered 2, 4, 6, 7, and 8 on the map and in the legend.

The other 15% of simple map units and the 15% or less in compound map units are inclusions. Inclusions are unnamed and undescribed soils components of map units. Inclusions may be soils that are named and have their own map units elsewhere in the survey area or they may be rare and insignificant soils that are not recognized and named at all in the survey (Mapping Systems Working Group 1981).

The soil map symbol is composed of the mapping unit symbol in the numerator and dominant slope class for the unit in the denominator.

# PART 3. SOIL ASSOCIATIONS AND MAP UNITS

## ACADIA ASSOCIATION (Ac)

### Material and landform

Soils of the Acadia Association have developed on very strongly to slightly acid, deep, level, silt loam to silty clay loam, marine sediments. These soils are found on reclaimed salt marsh that has been dyked to protect them from tidal flooding. Occasionally Acadia soils can be found on fine sandy loam marine sediments, but such occurrence is rare. Soil color varies in Acadia soils and usually is grayer, commonly even bluish gray, with depth and in places black where layers high in organic matter are present. Buried peat layers can also be found in some Acadia soils. Acadia soils have slow to extremely slow permeability and level to nearly level slopes. Acadia soils contain no gravel and are nonstony and nonrocky.

### Location and extent

Acadia soils are found on the Minas Lowlands along the northern shore of Cobequid Bay at the mouths of the major rivers that empty into the bay. Significant areas of Acadia soils are located near the mouths of the Salmon, Chiganois, Debert, and Great Village rivers. Smaller areas of Acadia soils are found inland to the south along the Shubenacadie River and near the mouth of the Stewiacke River. Acadia soils cover 3076 ha or 0.9% of the county.

### Soil characteristics

Acadia soils are young soils that exhibit little profile development (see Appendix 2, Table 2-1). Soil development has been hindered by tidal flooding and has proceeded only during the time that the dykes have been functioning. Little or no horizon development is observable in Acadia soils; however, depositional and gleyed layers of different colors and textures may be encountered. Soil textures are commonly silt loam to silty clay loam but can be as heavy as silty clay or as light as fine sandy loam. Textural changes can occur vertically within the profile and also within and between dykeland bodies. Acadia soils commonly have two colors, reddish brown near the surface and grays at some depth below the surface. The reddish brown soil material contains oxides and hydroxides of iron, whereas the gray layers do not. The grayish layers have been water-logged for extended periods and anaerobic bacteria in the presence of organic matter, have reduced much of the iron to "free iron" (Brydon and Heystek 1958).

A typical profile under forage crops has a 20 to 30 cm plow layer (Ap), which has well-developed fine blocky structure and is weakly to prominently mottled, moderately permeable, and silt loam to silty clay loam in texture. Below this plow layer soil colors range from reddish brown to grays. Mottling is present to varying degrees and soil structure ranges from moderate, coarse, prismatic to very weak, blocky.

Textures are commonly silt loam to silty clay loam. Below 50-70 cm the soil material is usually grayer in color, poorly structured, firm and slowly permeable. Poorly drained soil associates may contain bluish gray layers that are massive and very slowly permeable. Buried peat and mineral layers rich in organic matter are common in poorly drained soils. The peat layers are usually composed of moderately to poorly decomposed sedge material, which has been buried by tidal sediments during extremely high tides before the marshland was dyked. In some Acadia soils the gray layers contain prominent yellow mottles of basic ferric sulfates, which have been produced by the microbial oxidation of ferrous iron sulfides, such as pyrite (Ross and Ivarson 1981). This oxidation reaction produces sulfuric acid, which results in a drastic lowering of soil pH and the formation of acid sulfate soils.

The imperfectly drained associates of the Acadia Association are predominantly reddish brown throughout the profile, lower in organic matter, coarser textured, and more permeable than the poorly drained Acadia soils. They also lack strongly gleyed gray layers, yellow mottles, and peaty layers.

Acadia soils have increasing pH, sodium, potassium, and magnesium levels with depth and high organic matter levels throughout the profile (see Appendix 2, Table 2-1). Acadia soils are saturated for extended periods throughout the growing season. Surface ponding in the spring and late fall is common on dykeland that is not landformed or where the drainage ditches require cleaning.

### Soil limitations and use

Acadia soils are used exclusively for agriculture and are predominantly planted to forage grasses. Cereals and silage corn are also grown to a limited extent. These soils have high levels of natural fertility, good water-holding capacities, level topography, and are stone free. Acadia soils are potentially some of the most productive agricultural soils in the province if intensively managed.

Acadia soils are drained through a combination of landforming, ditching, and outflow through "aboiteaux." An aboiteau is a one-way sluice gate that allows drainage water to drain from the ditches to the sea at low tide and closes to prevent back flow at high tide. Even with properly functioning drainage systems, Acadia soils remain saturated for significant periods during spring, late fall, and after heavy rains because of their low drainable porosity. During wet periods trafficability is greatly reduced, and the soils are subject to rutting and compaction during planting and harvesting operations.

On Acadia soils that have not had adequate time for these salts to be leached out, salinity within the rooting zone can injure sensitive crops. This problem is not uncommon in recently dyked soils or in those that have had saline horizons exposed during landforming operations. Acadia soils that have developed acid sulfates and extremely low pH values within the rooting zone present a potential limitation to crop growth, the extent and severity of which is not understood at present.

### Associated soils

Acadia soils are associated with the Stewiacke, Cumberland, Hebert, and Castley soil associations. They are also associated with the Salt Marsh and Coastal Beach land types.

### Map units

Three map units have been established for the Acadia Association.

Ac3 (5 areas: 236 ha). Ac3 map units are composed of imperfectly drained Gleyed Regosols. Ac3 map units are nonstony and nonrocky.

Ac4 (16 areas: 1696 ha). Ac4 map units are composed dominantly of imperfectly drained Gleyed Regosols and Rego Gleysols with significant inclusions of poorly drained Rego Gleysols (Ac5 map units). Ac4 map units are nonstony and nonrocky.

Ac5 (8 areas: 642 ha). Ac5 map units are composed of poorly drained Rego Gleysols. These units are nonstony and nonrocky.

Ac6 (13 areas: 502 ha). Ac6 map units are composed dominantly of poorly drained Rego Gleysols (Ac5 map units) with significant inclusions of very poorly drained organic soils of the Castley (Ct) Association. These units are nonstony and nonrocky.

## CASTLEY ASSOCIATION (Ct)

### Parent material, landform, and soil characteristics

Castley soils have developed in 40-60 cm of poorly decomposed peat over 50-180 cm of moderately decomposed peat of mixed origin over mineral material. These organic materials are extremely to strongly acidic and are found on level to nearly level basin bogs, domed bogs, stream fens, and stream swamps. Peat depths generally range from 40 cm at the mineral edges surrounding the peatlands to 230 cm near the centres. On larger basin and domed bogs, peat depths can exceed 2.5-3 m near their centres. Bogs typically have poorly decomposed sphagnum peat overlying moderately decomposed fen or forest peat. Domed bogs have very thick deposits of poorly decomposed sphagnum peat forming the dome. Bogs are found in very poorly drained depressions and basins and are associated with stunted black spruce, ericaceous shrubs, and sphagnum moss vegetation.

Stream fens are found adjacent to meandering slowly flowing streams and are composed of 40-100 cm of poorly to moderately decomposed sedge peat overlying fine alluvial sediments. Stream fens are commonly associated with bogs that are more removed from the streams and are not influenced by their nutrient-rich waters. Fens are associated with sedge and stunted tamarack vegetation.

Stream swamps are located in depressions and channels with standing or gently flowing waters of ephemeral streams and are composed of 40-100 cm of moderately decomposed forest peat overlaying strongly gleyed glacial till or other mineral sediments. Swamps are associated with dense forest, tall shrub, and luxuriant herb vegetation.

## Location and extent

Soils of the Castley Association are found predominantly on the Northumberland and Minas lowlands. Castley soils cover 2036 ha or 0.6% of the county.

## Soil limitations and use

The use of Castley soils for agriculture is limited by their very poor drainage and high water tables, which persist at or near the surface for most of the year. These soils have very poor soil strength and poor trafficability. The large, deep bogs have some potential for vegetable production but require expensive drainage work and fertility improvements. Large peat bogs are potential sources of horticultural peat.

## Associated soils

On the Northumberland Lowlands, Castley soils are associated with Queens, Pugwash, and Stewiacke soils. On the Minas Lowlands, Castley soils are associated with Queens, Fash, Millbrook, and Stewiacke soils.

## Map units

One map unit has been established in the Castley Association.

Ct (72 areas: 2036 ha). Ct map units are composed of very poorly drained Typic and Terric Fibrisols, and Fibric Mesisols on bogs; Fibric, Terric, and Cumulo Mesisols on fens; and Fibric, Typic, Terric, and Humic Mesisols on swamps. All peatland types have been grouped and mapped as Ct map units. Peatland types cover only a small area in Colchester County and are commonly intermixed with each other making it impossible to map them separately at the 1:50 000 scale.

Ct map units have level to nearly level slopes (0-2%) and are located in very poorly drained depressions and channels and adjacent to meandering streams. Ct map units are nonstony and nonrocky.

## COBEQUID ASSOCIATION (Cd)

### Parent material and landform

Soils of the Cobequid Association have developed in 50-70 cm of friable, gravelly sandy loam to gravelly loam over compact, extremely to very strongly acidic, dark yellowish brown, gravelly to very gravelly sandy loam till. This parent material is derived from a mixture of igneous and metamorphic rocks originating from the underlying bedrock. The till is shallow and typically less than 2 m thick and contains abundant gravels, cobbles, and stones, which increase in abundance with depth.

Cobequid soils are very stony and non to moderately rocky and are found on rolling to hummocky till veneers and blankets, which conform to the shape of the underlying bedrock. Cobequid soils are located predominantly on very gentle to moderate slopes (2-15%); however, in ravines and deeply incised mountain valley slopes, Cobequid soils can be found on strong to very strong slopes (15-45%).

### Location and extent

Soils of the Cobequid Association are found in the Cobequid Upland Physiographic Zone and extend from Five Islands in the west to Earltown in the east. They cover 20 275 ha or 5.7% of the county.

### Soil characteristics

Under forested vegetation Cobequid soils have an extremely acidic humus layer, 3-20 cm thick (see Appendix 2, Table 2-2). Humus forms (Day 1983) are variable and range from thin, well-decomposed mull to thicker, more poorly decomposed, moder and mor types. Below the surface organic horizon, 50-70 cm of friable material overlies the compact subsoil. This friable material ranges in texture from gravelly loam to gravelly sandy loam. Under hardwood or mixed wood vegetation the amount of organic matter in the surface mineral soil can be significant under mull and moder. Organic carbon is frequently more than 5% in the B horizons of well and imperfectly drained soils. The high organic matter content creates a B horizon that is very friable and porous. The degree of subsoil compaction decreases as the depth to bedrock and clay content decrease and as the coarse fragment content increases. Coarse fragment content in the parent material can range from 20-60% by volume. The higher levels are most common in soils with bedrock close to the surface.

### Soil limitations and use

Common agricultural use of Cobequid soils is limited principally by the harsh local climate, excessive stoniness, acidity, and low fertility. Small areas of abandoned farmland are used for lowbush blueberry production. Some Cobequid soils have good potential to support maple syrup operations.

The dominant land use of Cobequid soils is for forestry.

Associated soils

Cobequid soils are associated with the Westbrook, Thom, and Wyvern soil associations in the Cobequid Upland Physiographic Zone.

Map units

Six map units have been established for the Cobequid Association.

Cd1 (5 areas: 1056 ha). Cd1 map units are composed of well-drained Orthic Ferro-Humic Podzols, Orthic Humo-Ferric Podzols, Sombric Ferro-Humic Podzols, and Sombric Humo-Ferric Podzols. These map units are very stony and range from slightly to moderately rocky. They are commonly located on upper slope positions with good surface drainage. These units are usually covered with mixed hardwood forest.

Cd2 (43 areas: 7110 ha). Cd2 map units are composed dominantly of well-drained Orthic Ferro-Humic Podzols, Sombric Ferro-Humic Podzols, Sombric Humo-Ferric Podzols, and Orthic Humo-Ferric Podzols (Cd1 map units), with significant inclusions of imperfectly drained Gleyed Sombric Ferro-Humic Podzols and Gleyed Humo-Ferric Podzols (Cd3 map units). They are very stony and slightly to moderately rocky. The well-drained soils are located on the hummocks and upper slope positions, whereas the imperfectly drained soils are usually in the depressions that receive seepage from upslope. The vegetation consists of mixed hardwood on the Cd1 units and mixed hardwood and softwood on the imperfectly drained units (Cd3).

Cd3 (32 areas: 6200 ha). Cd3 map units are composed of imperfectly drained Gleyed Sombric Ferro-Humic Podzols and Gleyed Ferro-Humic Podzols. These units are located on mid to lower slope areas that receive runoff and seepage from upslope areas. They are very stony, slightly to moderately rocky, and usually associated with mixed wood or conifer forest.

Cd4 (21 areas: 4158 ha). Cd4 map units are composed dominantly of imperfectly drained Gleyed Ferro-Humic Podzols, Gleyed Sombric Ferro-Humic Podzols (Cd3 map units) with significant inclusions of poorly drained Orthic Gleysols, and Orthic Humic Gleysols (Cd5 map units). These units are located in depressions that receive abundant runoff and seepage from surrounding elevated areas and are very stony and slightly rocky. Conifer forest with a significant component of black spruce is typical for this unit.

Cd5 (15 areas: 1505 ha). Cd5 map units are composed of poorly drained Orthic Gleysols and Orthic Humic Gleysols. These units are located in depressions and on very gentle lower slopes. These units are commonly associated with open water and wetlands and are very stony and nonrocky. Associated vegetation consists of black spruce forest, alders, and sphagnum mosses.

Cd6 (4 areas: 247 ha). Cd6 map units include the poorly drained Orthic Gleysols and Orthic Humic Gleysols (Cd5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in depressions or areas that receive abundant runoff and seepage from upslope areas and remain saturated throughout the year. They are very stony and nonrocky. Black spruce - sphagnum forest in combination with bog and fen vegetation is typical for this map unit.

## CUMBERLAND ASSOCIATION (Cm)

### Parent material and landform

Soils of the Cumberland Association have developed in 30-80 cm of friable sandy loam to loam over strongly to very strongly acidic, sand and gravel alluvium. The underlying sand and gravel material is loose and frequently stratified. Cumberland soils are found on level to very gently sloping (0-5%) floodplains and are nonstony and nonrocky.

### Location and extent

Cumberland soils are found adjacent to stream and river courses throughout the county. They cover 5438 ha or 1.5% of the county.

### Soil characteristics

Cumberland soils are young soils and show little profile development (see Appendix 2, Table 2-3). However, a distinct layering of flood-deposited sediments, commonly of different textures, is a noticeable feature. Under forested conditions a thin organic layer may be present. In locations that are flooded frequently, this layer may be buried or washed away. Cumberland soils are characterized by 30-80 cm of sandy loam to loam sediments over much coarser sand and gravel alluvium, which may be stratified.

The periodic replenishment of nutrients in flood deposited sediments counters nutrient losses by leaching. Therefore Cumberland soils are slightly more fertile and less acidic than upland soils (see Appendix 2, Table 2-3). Cumberland soils are porous and fertile and support a productive forest rich in understory species.

Imperfectly and poorly drained Cumberland soils are common in depressions and remain saturated for extended periods during and after periods of high river flow.

## Soil limitations and use

Cumberland soils are prone to flooding, and stream bank erosion can be severe in some locations. Cold air draining from the uplands can collect on the valley floor creating frost pockets over Cumberland soils. As a result the frost-free period is shortened, which limits the range of crops that can be grown on these soils. Where underlying sands and gravels come close to the surface, the water-holding capacity of Cumberland soils is severely reduced. This situation can promote droughty conditions during dry growing seasons. However, excellent crops can be grown on these droughty soils where irrigation is used.

The subsurface gravels of Cumberland soils are used as a source of construction aggregate.

## Associated soils

Cumberland soils are commonly associated with Hebert soils and differ in texture from the silt loam and silty clay loam alluvial soils of the Stewiacke Association.

## Map units

Six map units have been established for the Cumberland Association.

Cm1 (31 areas: 1036 ha). Cm1 map units are composed of rapidly and well-drained Orthic Regosols and Cumulic Regosols. These units are located on the higher elevations of the floodplain. The underlying sands and gravels are closest to the surface in the rapidly drained soils. Cm1 units are nonstony and nonrocky.

Cm2 (32 areas: 2431 ha). Cm2 map units are composed dominantly of rapidly and well-drained Orthic Regosols and Cumulic Regosols (Cm1 map units) with significant inclusions of imperfectly drained Gleyed Regosols and Gleyed Cumulic Regosols (Cm3 map units). These units are nonstony and nonrocky.

Cm3 (24 areas: 1218 ha). Cm3 map units are composed of imperfectly drained Gleyed Regosols and Gleyed Cumulic Regosols. These units are located in slowly drained areas where high water tables are maintained for a significant period of the growing season by the river or by runoff from the adjacent upland. These units are nonstony and nonrocky.

Cm4 (10 areas: 504 ha). Cm4 map units are composed dominantly of imperfectly drained Gleyed Regosol and Gleyed Cumulic Regosol (Cm3 map units), with significant inclusions of poorly drained Rego Gleysol and Rego Humic Gleysol (Cm5 map units). These units are located in slowly drained depressions where high water tables are maintained for significant periods of the growing season by the river or by runoff from the adjacent upland. These units are nonstony and nonrocky.

Cm5 (15 areas: 249 ha). Cm5 map units are composed of poorly drained Rego Gleysols and Rego Humic Gleysols. These units are located in slowly drained depressions that remain wet for most of the growing season. These units are nonstony and nonrocky.

Cm6 (6 areas: 184 ha). Cm6 map units are composed dominantly of poorly drained Rego Gleysol and Rego Humic Gleysol (Cm5 map units), with significant inclusion of very poorly drained organic soils of the Castley Association. These units are nonstony and nonrocky.

## DILIGENCE ASSOCIATION (Dg)

### Parent material and landform

Soils of the Diligence Association have developed in 30-50 cm of friable loam to silt loam over compact, very strongly acidic, grayish to olive brown, gravelly silty clay loam to gravelly clay loam till derived from gray Carboniferous shales. In locations where the till is shallow over bedrock, the texture of the subsoil is frequently a gravelly silt loam.

Diligence soils are slightly to moderately stony and non to slightly rocky and are found on hummocky to gently rolling till landscapes dissected by large gullies and river valleys. Slopes range from very gentle to gentle (2-9%) on the rolling segments of the landscape to moderately and strongly sloping (10-30%) in the dissected river valleys and along the southern limits of the Diligence soil area.

### Location and extent

Soils of the Diligence Association are found in a small band on the Minas Lowlands north of Truro, that runs parallel to the Cobequid Upland from Debert to just east of Manganese Mines. Diligence soils cover 8837 ha or 2.5% of the county.

### Soil characteristics

Under forest vegetation, Diligence soils (see Appendix 2, Table 2-4) have 5-15 cm of extremely acidic, poorly decomposed mor. This organic forest litter layer is underlain by 30-50 cm of friable silt loam to loam. Below this layer is a firm Btg(j) horizon, which is characterized by clay films on the surfaces of the firm, coarse, angular blocky peds or soil aggregates. This horizon is distinctly to prominently mottled with orange and yellow iron oxide stains.

The Btg(j) horizon is about 30 cm thick and grades gradually into the underlying compact till subsoil. Soil textures are similar for the Bt and C horizons and typically range from gravelly silty clay loam to gravelly clay loam. Soil permeability drops significantly in the Bt horizon and is slow to very slow in the C horizon. On gently sloping landscapes, where seepage and surface runoff are very slow, the impermeable subsoils cause perched watertables to rise close to the soil surface in the spring and early winter. Under these conditions Diligence soils remain saturated for prolonged periods.

Soil limitations and use

Soils of the Diligence Association are limited for a wide range of uses by soil wetness, shallow rooting depths, impermeable subsoil, steep topography, high acidity, high clay content, and low fertility. In some areas shallowness to bedrock and stoniness are also limitations for some uses.

Some Diligence soils on gently sloping terrain had been cleared and cultivated in the past. However, most of these areas have been abandoned and have reverted back to forest. Cultivated areas are used primarily for pasture and forage production. The remaining areas are under conifer and mixed wood forest.

Associated soils

Diligence soils are associated with Folly and Thom soils to the north of their distribution and with Woodville soils to the south. Where Diligence soils are adjacent to Woodville soils they commonly lose their gray appearance and take on the reddish Woodville color.

Map units

Three map units have been established for the Diligence Association.

Dg3 (17 areas: 2788 ha). Dg3 map units are composed of imperfectly drained Gleyed Brunisolic and Gleyed Podzolic Gray Luvisols. These units are moderately stony and nonrocky to slightly rocky and are found on slopes with good surface drainage.

Dg4 (20 areas: 4502 ha). Dg4 map units are composed dominantly of imperfectly drained Gleyed Brunisolic and Podzolic Gray Luvisols (Dg3 map units) with significant inclusions of poorly drained Orthic Luvic Gleysols (Dg5 map units). Dg4 map units are found on very gentle to moderate slopes. The imperfectly drained soils are located on the upper slopes and have good surface drainage. The poorly drained soils are located on lower, gentle slopes and in depressions that receive excess runoff and seepage. Dg4 units are slightly to moderately stony and nonrocky.

**Dg5** (10 areas: 1547 ha). Dg5 map units are composed of poorly drained Orthic Luvic Gleysols and are found in depressions and on very gentle to gentle slopes with poor surface drainage. Peaty soil surfaces and black spruce - sphagnum moss forests are frequently associated with this unit. Dg5 units are moderately stony and nonrocky.

## FASH ASSOCIATION (Fs)

### Parent material and landform

Soils of the Fash Association have developed in deep strongly to extremely acidic, dark reddish brown to brown, silt loam to clay lacustrine sediments. The dominant textures range from silt loam to silty clay loam but occasionally textures as heavy as clay and as light as fine sandy loam are found. This material is frequently stratified and may contain numerous thin horizontal layers (varves). Fash soils contain no coarse fragments and are nonstony and nonrocky.

Soils of the Fash Association are found on level to very gently sloping (0-5%) lacustrine basins and plains.

### Location and extent

Fash soils are found on the Minas Lowlands in the Stewiacke River valley usually at elevations less than 80 m asl. They cover 1768 ha or 0.5% of the county.

### Soil characteristics

Under coniferous forest, Fash soils have 5-15 cm of extremely acidic, poorly decomposed mor (see Appendix 2, Table 3-5). Underlying this organic mat is 15-30 cm of friable, mottled, silt loam to loam material. Below this friable layer is a firm, distinctly to prominently mottled Btg(j) horizon. This horizon has moderately slow permeability, which causes perched water tables to persist near the surface for extended periods during the spring, late fall, early winter, and after prolonged heavy rains. The texture of the Btg(j) horizon ranges from silty clay loam to silt loam. The Btg(j) horizon extends to a depth of 60-70 cm and grades gradually into poorly structured subsoil. This C horizon is firm to very firm, poorly structured, and commonly mottled. The C horizon has extremely slow permeability and typically ranges in texture from silt loam to silty clay loam.

### Soil limitations and use

Fash soils are limited for a wide range of uses by excess wetness, slow permeability, high acidity, low fertility, and high silt and clay content.

Fash soils are used for forage production and pasture. Most of the Fash soils are under coniferous forest.

### Associated soils

Fash soils are associated with Queens, Castley, and Stewiacke soils and are similar in texture and color to the Stewiacke soils. However, Stewiacke soils are flooded by adjacent rivers and streams and therefore have little profile development. Fash soils are not flooded by rivers and display profile development.

### Map units

Three map units have been established for the Fash Association.

Fs4 (8 areas: 588 ha). Fs4 map units are composed dominantly of imperfectly drained Gleyed Brunisolic Gray Luvisols with significant inclusions of poorly drained Orthic Luvic Gleysols (Fs5 units). Fs4 map units are nonstony and nonrocky.

Fs5 (5 areas: 1057 ha). Fs5 map units are composed of poorly drained Orthic Luvic Gleysols. These units are nonstony and non rocky.

Fs6 (1 area: 123 ha). Fs6 map units are composed dominantly of poorly drained Orthic Luvic Gleysols with significant inclusions of very poorly drained organic soils of the Castley Association. Fs6 map units are nonstony and nonrocky.

## FOLLY ASSOCIATION (Fo)

### Parent material and landform

Soils of the Folly Association have developed in 30-70 cm of sandy loam to gravelly sandy loam over weakly compacted extremely to very strongly acidic, dark brown to brown, gravelly sandy loam till derived from a mixture of sandstone, conglomerate, and igneous rocks. The till is shallow on knolls and on some of the steeper slopes and is thicker in depressions and on the more gentle slopes.

Folly soils are slightly to very stony and non to slightly rocky. They are found on undulating to hummocky till blankets on very gentle to moderate slopes (2-15%).

### Location and extent

Soils of the Folly Association are located on the northern edge of the Minas Lowlands at the base of the Cobequid Upland. The soils are distributed in a band 3-4 km wide, which extends from Londonderry to Upper North River. Folly soils cover 11 287 ha or 3.2% of the county.

## Soil characteristics

Under mixed wood forest, Folly soils (see Appendix 2, Table 2-6) have 5-12 cm of extremely acidic mor. Underlying this surface organic layer is 30-70 cm of friable sandy loam to gravelly sandy loam. Below the friable layer is a firm to slightly compacted gravelly sandy loam till subsoil. The subsoil is frequently fragic and has moderately slow permeability, which causes perched water tables on the lower gentle slopes and seepage spots on the longer slopes. Folly soils contain cobbles and stones throughout the profile and are characterized by many small plagioclase fragments in the soil matrix.

## Soil limitations and use

The agricultural use of Folly soils is limited by their stoniness, acidity, low fertility, and adverse soil moisture regime. Folly soils are predominantly covered with mixed wood forests of spruce, fir, birch, poplar, and maple, which are used extensively for pulp and fire wood. Small areas are used for pasture and forage production and some of the better-drained areas are managed for lowbush blueberry production.

## Associated soils

Folly soils are associated with Cobequid soils to the north on the Cobequid Upland. To the south on the Minas Lowlands, Folly soils are associated with Portapique, Thom, Diligence, and Truro soils.

## Map units

Five map units have been established for the Folly Association.

Fo1 (4 areas: 430 ha). Fo1 map units are composed of moderately well-drained Orthic Humo-Ferric Podzols. These units are located on upper slope positions and have good internal and surface drainage. Fo1 units are moderately to very stony and slightly rocky.

Fo2 (8 areas: 1563 ha). Fo2 map units are composed dominantly of moderately well-drained Orthic Humo-Ferric Podzols with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Fo3 map units). These units are located on mid to upper slope positions and are moderately to very stony and slightly rocky.

Fo3 (21 areas: 5175 ha). Fo3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. These units are located on mid to lower slope positions and are moderately to very stony and slightly rocky.

Fo4 (11 areas: 2610 ha). Fo4 map units are composed dominantly of imperfectly drained Gleyed Humo Ferric Podzols and Fragic Humo-Ferric Podzols with significant inclusions of poorly drained Orthic Gleysols (Fo5 map units). These map units are located on lower slopes and in depressions that receive seepage and runoff. Fo4 map units are moderately to very stony and nonrocky.

Fo5 (6 areas: 1509 ha). Fo5 map units are composed of poorly drained Orthic Gleysols and are found in depressions that remain saturated for long periods throughout the growing season. These units are slightly to moderately stony and nonrocky.

## HANSFORD ASSOCIATION (Hd)

### Parent material and landform

Soils of the Hansford Association have developed in 40-60 cm of friable sandy loam to gravelly sandy loam over compact, extremely to very strongly acidic, reddish brown, gravelly sandy loam to gravelly loam till derived from sandstone. The till is in some places shallow and has a gravel and cobble content of 20-35% by volume.

Hansford soils are moderately stony and non to slightly rocky. Soils of the Hansford Association are found on hummocky, rolling, and undulating till blankets on very gentle to strong slopes (2-30%).

### Location and extent

Hansford soils are found on the Minas Lowlands north of Cobequid Bay. They are found in isolated pockets from Economy to Londonderry. Hansford soils cover 3902 ha or 1.1% of the county.

### Soil characteristics

Under conifer or mixed wood forest, Hansford soils (see Appendix 2, Table 2-7) have 5-10 cm of very strongly acidic mor. Underlying this surface organic layer is 40-60 cm of friable sandy loam to gravelly sandy loam. Below this friable upper soil material lies a compact gravelly loam to gravelly sandy loam till subsoil. This subsoil has moderately to moderately slow permeability. The slower permeabilities are found in the imperfectly and poorly drained soils in which the compacted subsoil causes perched water tables in the spring, late fall, and early winter months. Fragipans and compact basal till are prominent features of imperfect and poorly drained Hansford soils.

### Soil limitations and use

The agricultural use of Hansford soils is limited by their compact subsoil, acidity, low fertility, and adverse soil moisture regimes.

Hansford soils are predominantly covered with conifer and mixed wood forest, which is used for pulpwood. Old cleared and cultivated areas have reverted back to forest or are used for blueberry production. Some of the better areas of Hansford soil are used for forage production.

### Associated soils

Hansford soils are associated with Folly and Cobequid soils to the north and Queens and Portapique soils to the south.

### Map units

Four map units have been established for the Hansford Association.

Hd1 (3 areas: 587 ha). Hd1 map units are composed of well-drained Orthic Humo-Ferric Podzols. These units are located principally on upper slope positions that have good surface and internal drainage. Hd1 map units are moderately stony and non to slightly rocky.

Hd2 (6 areas: 1088 ha). Hd2 map units are composed predominantly of well-drained Orthic Humo-Ferric Podzols (Hd1 units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Hd3 units). Hd2 map units are moderately stony and nonrocky.

Hd3 (7 areas: 1040 ha). Hd3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. Hd3 map units are located on middle to lower slope positions on very gently to gently sloping terrain. Hd3 map units are moderately stony and nonrocky.

Hd4 (5 areas: 833 ha). Hd4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Hd3 units) with significant inclusions of poorly drained Orthic Gleysols (Hd5 units). These units are located in depressions and on lower slope positions that receive seepage and surface runoff. Hd4 units remain wet for significant periods throughout the growing season. Hd4 map units are moderately stony and nonrocky.

Hd5 (4 areas: 354 ha). Hd5 map units are composed of poorly drained Orthic Gleysols. These units are located in poorly drained depressions that remain saturated throughout most of the growing season. Hd5 map units are moderately stony and nonrocky.

## HEBERT ASSOCIATION (He)

### Parent material and landform

Soils of the Hebert Association have developed in 40-60 cm of friable gravelly loamy sand to gravelly loam over loose, very strongly to extremely acidic, glaciofluvial sands and gravels. The subsoil material contains an abundance of rounded gravels originating predominantly from igneous and metamorphic bedrock located in the Cobequid Upland. These sediments were moved by glacial meltwaters from their origin in the Upland to the adjacent lowlands. The sands and gravels are loose and frequently stratified and have moderately rapid to very rapid permeability.

Hebert soils are slightly stony and nonrocky and are found on gentle to strong slopes (5-30%) on mounded and terraced kames and on sinuous esker deposits. The greatest areas of Hebert soils are located on undulating to rolling outwash plains and valley bottom deposits on very gentle to gentle slopes (2-9%).

## Location and extent

Hebert soils are scattered throughout the county. Significant areas of Hebert soils occur north of Cobequid Bay on the Minas Lowlands, throughout the Stewiacke River valley, and near Earltown in the Cobequid Upland. Hebert soils cover 22 166 ha or 2.5% of the county.

## Soil characteristics

Under forested vegetation Hebert soils (see Appendix 2, Table 2-8) have a thin (<5 cm) poorly decomposed, extremely acidic, layer of mor. Below this organic mat is 40-60 cm of very strongly acidic, friable gravelly loam to very friable loamy sand, which overlays loose glaciofluvial sands and gravels. Hebert soils are highly porous and have rapid internal drainage. Occasionally slowly permeable loamy layers are bedded above or within the gravelly subsoil and restrict internal soil drainage. Some Hebert soils have cemented Bfc horizons called ortstein. Strongly developed ortstein layers restrict root growth and reduce soil permeability and internal soil drainage. The occurrence of ortstein layers in Hebert soils in Colchester County is limited. Generally when ortstein is present it does not form a continuously cemented layer over large areas but occurs in discontinuous patches.

## Soil limitations and use

The agricultural use of Hebert soils is limited by droughtiness or low water-holding capacity, acidity, and low fertility. Droughtiness is a serious problem for crop production during dry growing seasons especially where the gravelly subsoil is close to the surface.

Hebert soils are predominantly covered with softwood forest, composed of pine and red spruce with minor amounts of fir and birch. Areas under cultivation are predominantly used for forage or pasture. Under irrigation, horticultural and vegetable crops like strawberries and carrots can be grown successfully.

Hebert soils are highly prized as a source of aggregate for road building and surfacing and as an ingredient in concrete and asphalt.

## Associated soils

Hebert soils on valley bottom deposits are frequently associated with alluvial soils of the Cumberland and Stewiacke associations.

## Map units

Seven map units have been established for the Hebert Association.

Hel (76 areas: 8362 ha). Hel map units are composed of rapidly to well-drained Orthic Humo-Ferric Podzols. Hel units predominate on all glaciofluvial deposits that are deep and lack slowly permeable layers. These units are slightly stony and nonrocky.

He2 (84 areas: 7753 ha). He2 map units are composed dominantly of rapidly to well-drained Orthic Humo-Ferric Podzols (He1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (He3 map units). These units are slightly stony and nonrocky.

He3 (33 areas: 2913 ha). He3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols. These map units commonly occur in depressional to level areas that are underlain by slowly permeable material, which reduces internal drainage and creates perched water tables during wetter periods. He3 map units are slightly stony and nonrocky.

He4 (8 areas: 684 ha). He4 map units are composed dominantly of imperfectly drained Gleyed Orthic Humo-Ferric Podzols with significant inclusions of poorly drained Orthic Gleysols. These units are slightly stony and nonrocky.

He5 (17 areas: 1252 ha). He5 map units are composed of poorly drained Orthic Gleysols. These map units occur in depressional to level areas that are underlain by very slowly permeable material, which reduces internal drainage and causes perched water tables that saturate the soil for prolonged periods during the growing season. These units are slightly stony and nonrocky.

He6 (4 areas: 286 ha). He6 map units are composed dominantly of poorly drained Orthic Gleysols (He5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in depressions that receive abundant runoff and seepage and remain saturated throughout the year. He6 units are slightly stony and nonrocky.

He7 (5 areas: 916 ha). He7 map units are composed dominantly of rapidly to well-drained Orthic Humo-Ferric Podzols (He1 map units) with significant inclusions of poorly drained Orthic Gleysols (He5 map units). These units occur on hummocky or mounded kame and esker landscapes. The rapidly to well-drained units are located on the hummocks and ridges of these deposits. The poorly drained units (He5) are found in the depressions between the hummocks. He7 units are slightly stony and nonrocky.

## KIRKHILL ASSOCIATION (Kh)

### Parent material and landform

Kirkhill soils have developed in 60-80 cm of friable gravelly loam to gravelly sandy loam over weakly compacted, strongly acidic, olive to grayish brown, gravelly sandy loam to very gravelly sandy loam till. The till is shallow and derived from gray Carboniferous shales and contains from 35-70% shaly coarse fragments.

Kirkhill soils are moderately to very stony and non to slightly rocky. They are found on undulating to rolling till veneers and as thin blankets on very gentle to strong slopes (2-30%).

## Location and extent

Soils of the Kirkhill Association are found on the Minas Lowlands along the base of the Cobequid Upland from the Cumberland County border to Five Islands and on the Horton Highlands in the southeastern part of Colchester County from Eastville, north to the Pictou County border. They cover 2547 ha or 0.7% of the county.

## Soil characteristics

Under mixed wood forest, Kirkhill soils (see Appendix 2, Table 2-9) have 5-10 cm of semi-decomposed, extremely acidic mor. Underlying this organic mat is 60-80 cm of friable gravelly loam to gravelly sandy loam. This layer contains abundant shaly gravel and flagstones and is very porous. On till veneers this friable layer is typically underlain by a weakly compacted subsoil high in coarse fragments that grades with depth into shattered shale bedrock. On thicker till deposits the subsoil is more compacted and has moderate to slow permeability and a lower coarse fragment content than the shallower veneers.

## Soil limitations and use

Kirkhill soils are limited in their use for agriculture by surface stoniness, shallowness to bedrock, droughtiness, high acidity, low fertility and adverse topography. Cleared areas of Kirkhill soils are mainly used for grazing and hay production. Some of the abandoned, better-drained Kirkhill soils are being used for blueberry production. Most Kirkhill soils are used for forestry and fir, red spruce, maple, and birch are harvested for pulp and fire wood.

## Associated soils

In the Five Islands area, the Kirkhill soils are associated with the Cobequid, Woodville, and Hebert soils. In the southeast area along the Pictou border, Kirkhill soils are associated with Millbrook, Queens, Thom, and Perch Lake soils.

## Map units

Five map units have been established for the Kirkhill Association.

Kh1 (5 areas: 702 ha). Kh1 map units are composed of well-drained Orthic Humo-Ferric Podzols on upper slope positions, that are commonly shallow to bedrock and have good surface drainage. These units are moderately to very stony and non to slightly rocky.

Kh2 (8 areas: 1510 ha). Kh2 map units are composed dominantly of well-drained Humo-Ferric Podzols (Kh1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (Kh3 map units). These map units are located on upper to middle slope positions. Kh2 map units are moderately to very stony and non to slightly rocky.

Kh3 (2 areas: 131 ha). Kh3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols located on lower slope positions that receive seepage and on gentle slopes with reduced surface drainage. Kh3 map units are moderately to very stony and nonrocky.

Kh4 (2 areas: 158 ha). Kh4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols (Kh3 map units) with significant inclusions of poorly drained Orthic Gleysols. Kh4 map units are moderately to very stony and nonrocky.

Kh6 (1 area: 46 ha). Kh6 map units are composed dominantly of poorly drained Orthic Gleysols with significant inclusion of very poorly drained organic soils of the Castley Association. Kh6 map units are located in depressions and receive abundant runoff and seepage. These map units remain saturated throughout the year. Kh6 map units are moderately to very stony and nonrocky.

## MILLBROOK ASSOCIATION (Mi)

### Parent material and landform

Millbrook soils have developed in 60-80 cm of friable gravelly sandy loam to loam over compact, very strongly acidic, dark reddish brown, gravelly loam to gravelly clay loam till. The compact subsoil contains more than 18% clay, is derived from shale and sandstone, and has a coarse fragment content ranging from 20-35% by volume.

Millbrook soils are slightly to moderately stony and are nonrocky. They are found on undulating to rolling till blankets on nearly level to moderate slopes (2-15%).

### Location and extent

Millbrook Soils are found predominately on the Minas Lowlands overlying Horton bedrock. A large area extends from Riversdale south to Graham Hill and east to the Pictou County border. Other areas are east of Manganese Mines and north of Kemptown, and north of Economy Lake on the Cobequid Upland. Millbrook soils cover 20 916 ha or 5.9% of the county.

### Soil characteristics

Under mixed wood forest, Millbrook soils (see Appendix 2, Table 2-10) have 3-10 cm of extremely acidic, poorly decomposed mor. Underlying this organic layer are 60-80 cm of gravelly sandy loam to loam. The underlying gravelly loam to gravelly clay loam subsoil is compact, has slow permeability, and contains more than 18% clay. Perched water tables in Millbrook soils are a common occurrence. On slopes this water flows over the slowly permeable subsoil as seepage. Millbrook soils have good moisture-holding capacity and remain moist throughout the growing season.

## Soil limitations and use

If adequately drained and cleared of surface stone, Millbrook soils are suitable for agriculture. Common limitations to the agricultural use of Millbrook soils are excess soil water early in the season, compact slowly permeable subsoils, surface stoniness, adverse topography, and high natural acidity. Where Millbrook soils are cleared for agriculture, they are used for forage production and pasture.

Millbrook soils are generally forested with hardwood and mixed wood stands on the moderately well-drained areas and softwoods on the imperfectly and poorly drained areas. These forests are harvested for lumber, pulp, and fire wood.

## Associated soils

Millbrook soils are associated with the Perch Lake, Thom, Kirkhill, Rawdon, Woodbourne, and Queens soils on the Minas Lowlands and with the Cobequid soils in the Cobequid Upland.

## Map units

Five map units have been established for the Millbrook association.

Mi2 (10 areas: 2517 ha). Mi2 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols (Mi3 map units) with significant inclusions of moderately well-drained Orthic Humo-Ferric Podzols. The moderately well-drained soils are found on upper slope positions and hilltops and have good surface drainage. Mi2 map units are slightly to moderately stony and nonrocky.

Mi3 (22 areas: 5254 ha). Mi3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols. These soils have slowly permeable subsoils and restricted surface drainage. Mi3 soils units are found on upper, middle, and lower slope positions. The presence of seepage, during the wet periods of the year, is characteristic of Millbrook soils located on mid to lower slopes. These soils are slow to dry and usually remain moist throughout the growing season. Mi3 map units are slightly to moderately stony and nonrocky.

Mi4 (32 areas: 8938 ha). Mi4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols (Mi3 map units) with significant inclusions of poorly drained Orthic Gleysols and Orthic Luvic Gleysols (Mi5 map units). These map units are located on lower slopes and in depressions that receive seepage and runoff from the surrounding uplands. Mi4 map units are slightly to moderately stony and nonrocky.

Mi5 (20 areas: 2847 ha). Mi5 map units are composed of poorly drained Orthic Gleysols, Humic Gleysols, and Orthic Luvic Gleysols and are located in wet depressions and on very gentle slopes with very poor surface drainage. These map units are saturated for extended periods throughout the growing season and are commonly associated with black spruce - sphagnum moss forest. Mi5 map units are slightly to moderately stony and nonrocky.

Mi6 (5 areas: 1360 ha). Mi6 map units are composed dominantly of poorly drained Orthic Gleysols, Humic Gleysols, and Orthic Luvic Gleysols with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very wet depressions. Mi6 map units are slightly to moderately stony and nonrocky.

## PERCH LAKE ASSOCIATION (Ph)

### Parent material and landform

Perch Lake soils have developed in 70-90 cm of friable, gravelly loam to very gravelly sandy loam over compact, strongly acidic, dark brown, gravelly sandy loam till. The till is shallow and stony and is derived from hard sandstone and arenite of the Horton Group. The till contains 35-50% angular gravels, cobbles, and stones.

Perch Lake soils are very to exceedingly stony and slightly to moderately rocky and are found on undulating to rolling till veneers and thin till blankets on nearly level to moderate slopes (0.5-15%).

### Location and extent

Perch Lake soils are located on the Horton Highlands and on the eastern end of the Southern Upland in the southeast corner of the county. Perch Lake soils cover 4864 ha or 1.4% of the county.

### Soil characteristics

Perch Lake soils (see Appendix 2, Table 2-11) have 5-10 cm of extremely acidic, poorly decomposed mor derived from conifer or mixed wood forest litter. This organic mat is underlain by 70-90 cm of friable gravelly loam to very gravelly sandy loam containing many angular cobbles and stones. A compact porous subsoil underlies this friable layer and has moderate to moderately rapid permeability. Perched water tables commonly occur in depressional and level to very gently sloping soils that are underlain by impervious bedrock near the surface.

### Associated soils

Perch Lake soils are associated with the Rawdon, Kirkhill, Millbrook, and Castley soils.

Soil limitations and use

The uses of Perch Lake soils are limited by severe stoniness, high volumes of coarse fragments, and shallowness to bedrock. Perch Lake soils are used principally for forestry.

Map units

Seven map units have been established for the Perch Lake Association.

Ph1 (4 areas: 2673 ha). Ph1 map units are composed of well-drained Orthic Humo-Ferric Podzols. They are located on upper to middle slope positions and on gently sloping areas of deeper till that have good internal drainage. Ph1 map units are very to exceedingly stony and slightly to moderately rocky.

Ph2 (10 areas: 1919 ha). Ph2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols (Ph1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (Ph3 map units). These units are very to exceedingly stony and slightly to moderately rocky.

Ph3 (3 areas: 927 ha). Ph3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols. These map units are located in areas with restricted surface drainage and on very gentle slopes that receive seepage and are underlain by impervious bedrock near the surface. Ph3 map units are very to exceedingly stony and slightly to moderately rocky.

Ph4 (3 areas: 1195 ha). Ph4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols (Ph3 map units) with significant inclusions of poorly drained Orthic Gleysols (Ph5 map units). These units are located in slowly drained depressions that remain wet for extended periods throughout the growing season. Ph4 map units are very to exceedingly stony and slightly to moderately rocky.

Ph5 (1 area: 33 ha). Ph5 map units are composed of poorly drained Orthic Gleysols and are located in poorly drained depressions. These units remain wet for most of the growing season. Ph5 map units are very to exceedingly stony and slightly to moderately rocky. These units are frequently associated with black spruce - sphagnum moss forest.

Ph6 (3 areas: 313 ha). Ph6 map units are composed dominantly of poorly drained Orthic Gleysols (Ph5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in depressions that receive abundant runoff and seepage and remain saturated throughout the year. Ph6 map units are very to exceedingly stony and slightly to moderately rocky.

Ph7 (2 areas: 102 ha). Ph7 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols (Ph1 map units) with significant inclusions of poorly drained Orthic Gleysols (Ph5 map units). These units occur on hummocky terrain where the hummocks are well drained and the depressions between the hummocks are poorly drained. Ph7 map units are very to exceedingly stony and slightly to moderately rocky.

## PORTAPIQUE ASSOCIATION (Pp)

### Parent material and landform

Portapique soils have developed in 60-80 cm of friable, gravelly sandy loam to sandy loam over weakly compacted, strongly acidic, dark reddish brown, gravelly sandy loam to very gravelly sand till derived principally from conglomerate. Portapique soils are slightly to moderately stony and are non to slightly rocky. They are found on undulating to rolling till blankets and veneers on very gentle to strong slopes (2-30%).

### Location and extent

Portapique soils are found on the Minas Lowlands from Folly River at East Mines to the base of Cobequid Upland through to Upper Bass River and from Pleasant Hills to Five Islands. The largest single area lies north of Great Village. Portapique soils cover 5632 ha or 1.6% of the county.

### Soil characteristics

Under a mixed wood or conifer forest, Portapique soils (see Appendix 2, Table 2-12) have 5-10 cm of very strongly acidic, poorly decomposed mor. Underlying this surface organic layer are 60-80 cm of very strongly acidic, friable gravelly sandy loam to sandy loam that grades into loose or weakly compacted gravelly sandy loam to very gravelly sand subsoil. The sand content of the subsoil is high and typically over 75%. Subsoils with gravelly sandy loam textures are commonly fragic or cemented to various degrees. Shallow Portapique soils commonly have the friable surface material lying directly over conglomerate bedrock. Portapique soils have moderately high permeability and good internal drainage where not cemented. However, subsoil permeability is greatly reduced where fragipan layers are present.

### Associated soils

Adjacent to the Cobequid Upland, Portapique soils are associated with Cobequid and Wyvern soils. On the Minas Lowlands, they are associated with Folly, Hansford, Truro, Millbrook, and Queens soils.

## Soil limitations and use

Soil limitations affecting the use of Portapique soils are high acidity, low fertility, stoniness, high coarse fragment content, shallowness to bedrock in some locations, and droughtiness during prolonged dry periods.

The greater portion of the Portapique soils are covered with birch, maple, spruce, and fir, which are harvested for pulp, saw logs, and fire wood.

Farmed Portapique soils are confined mainly to areas north of Great Village. These areas are used for pasture, forage, and grain production. Some better-drained areas are used for blueberry production.

## Map units

Four map units have been established for the Portapique Association.

Pp2 (13 areas: 2673 ha). Pp2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. The well-drained components of the units are on the upper slope positions and have good surface drainage. The imperfectly drained components are usually on mid to lower slopes and generally have fragipans. These units are slightly to moderately stony and non to slightly rocky.

Pp3 (14 areas: 2241 ha). Pp3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. Pp3 map units have restricted surface drainage or slow internal water movement caused by slowly permeable fragic layers, which cause perched water tables to form during wetter periods of the year. These units are slightly to moderately stony and non to slightly rocky.

Pp4 (4 areas: 653 ha). Pp4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Pp3 map units) with significant inclusions of poorly drained Orthic Gleysols (Pp5 map units). These units are located in depressions that receive seepage and runoff. Pp4 map units are slightly to moderately stony and nonrocky.

Pp5 (1 area: 65 ha). Pp5 map units are composed of poorly drained Orthic Gleysols and are located in poorly drained depressions that remain saturated for extended periods of the growing season. Pp5 map units are slightly to moderately stony and nonrocky.

## PUGWASH ASSOCIATION (Pw)

### Parent material and landform

Pugwash soils have developed in 40-60 cm of friable sandy loam to loam over compact, strongly acidic, reddish brown, sandy loam to loam till. The till is derived predominantly from red, brown, and gray Carboniferous sandstone and contains less than 20% gravel by volume. Pugwash soils are non to slightly stony and nonrocky. They are found on undulating to rolling till plains on level to moderate slopes (0-15%).

### Location and extent

Pugwash soils are found on the Northumberland and Minas Lowlands. They dominate the Northumberland Lowlands and cover about two thirds of the area. On the Minas Lowlands, Pugwash soils are not extensive and cover small areas near Shortts Lake, Alton, and South Branch. Pugwash soils cover 20 562 ha or 5.8% of the county.

### Soil characteristics

Under mixed wood or conifer forest Pugwash soils (see Appendix 2, Table 2-13) have 4-15 cm of extremely acidic, poorly decomposed mor. This organic layer is underlain by 40-60 cm of friable sandy loam to loam material containing less than 20% gravel by volume. A fragipan that commonly occurs below this friable layer is firm, has weak platy structure, and is very slowly permeable. The fragipan grades gradually into compact basal till, which is also very compact and very slowly permeable. Fracture planes, weakly structured compact subsoil, mottling, and gleying are common characteristics of imperfectly and poorly drained Pugwash soils. Textures in the subsoil are sandy loam and loam with clay contents less than 18%.

The slowly permeable subsoil maintains perched water tables on level to gentle slopes, and persistent seepage on steep lower slopes. These situations keep many Pugwash soils cold and saturated for varying periods in spring and early winter. On the Northumberland Lowlands, the warming of Pugwash soils in the spring is hampered by their close proximity to the frozen Northumberland Strait.

Pugwash soils found on the Minas Lowlands have some lenses of sorted sand and fine gravel and appear to be water worked in the surface. They also appear redder and coarser in texture than Pugwash soils on the Northumberland Lowlands.

### Soil limitations and use

The limitations to agricultural use of Pugwash soils are the shallow depth and slow permeability of the compact subsoil, the excess soil water caused by seepage and perched water tables, high acidity, and low fertility. These limitations can be overcome with the use of soil drainage systems and amendments to improve soil structure and fertility.

Once improved, Pugwash soils are suited for a wide range of crops. Currently these soils are used for pasture, the production of forages and, to a lesser extent, the production of cereal grains.

Pugwash soils are predominantly under forest and support conifer and mixed wood stands of red and white spruce, balsam fir, hemlock, white and red pine, maple, birch, and aspen. On poorly drained soils, stands of black spruce and tamarack predominate. These forests are used for the production of pulp wood and saw logs.

### Associated soils

Pugwash soils are associated with the Queens and Westbrook soils on the Northumberland Lowlands. On the Minas Lowlands they are associated primarily with the Queens soils. Pugwash and Queens soils are closely related and are distinguished from one another primarily on the clay content of the subsoil. Pugwash soils grade into Queens soils when the clay content of the subsoil rises above 18%.

### Map units

Six map units have been established for the Pugwash Association.

Pw1 (80 areas: 2715 ha). Pw1 map units are composed of moderately well-drained Orthic Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. These map units contain soils that have better surface drainage or have subsoils with higher permeabilities than the average Pugwash soil. These map units are non to slightly stony and nonrocky.

Pw2 (9 areas: 1012 ha). Pw2 map units are composed dominantly of moderately well-drained Orthic Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Pw1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Pw3 map units). These map units are non to slightly stony and nonrocky.

Pw3 (107 areas: 13 343 ha). Pw3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. Soils in these map units have subsoils that are compact, slowly permeable, and commonly fragic. These units are located on level, mid or lower slopes and have persistent perched water tables or receive seepage from upslope, or both. Pw3 map units are non to slightly stony and nonrocky.

Pw4 (9 areas: 1518 ha). Pw4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Pw3 map units) with significant inclusions of poorly drained Orthic Gleysols (Pw5 map units). Pw4 map units contain soils that are commonly fragic and have compact subsoils that have very slow permeability. These units are located on level to depressional landscape positions that have restricted surface drainage. These units receive runoff and seepage from upslope and remain wet for much of the growing season. Pw4 map units are non to slightly stony and are nonrocky.

Pw5 (58 areas: 1725 ha). Pw5 map units are composed of poorly drained Orthic Gleysols. Soils in these map units have very slowly permeable, compact subsoils, which are usually fragic. Pw5 map units are located in poorly drained depressions that receive seepage and runoff from surrounding uplands. Pw5 units remain wet for most of the growing season. These map units are non to slightly stony and nonrocky.

Pw6 (6 areas: 149 ha). Pw6 map units are composed dominantly of poorly drained Orthic Gleysols (Pw5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very poorly drained depressions and have water tables that persist at or near the soil surface for the duration of the growing season. Pw6 map units are non to slightly stony and nonrocky.

## QUEENS ASSOCIATION (Qu)

### Parent material and landform

Queens soils have developed in 10-30 cm of silt loam to clay loam over 30-50 cm of firm silt loam to clay loam over compact, strongly acidic to slightly acidic, dark reddish brown, loam to clay loam till. The till is derived from shale and sandstone and contains less than 20% gravel by volume. Queens soils are non to slightly stony and nonrocky and are found on undulating to rolling till plains on nearly level to moderate slopes (0.5-30%).

### Location and extent

Queens soils are found on the Northumberland and Minas lowlands. They predominate in the west and are interspersed with Pugwash soils in the eastern portion of the Northumberland Lowlands. On the Minas Lowlands, Queens soils range from Five Islands to the Pictou-Halifax border. The largest single area of Queens soils is somewhat triangular in shape, is bordered by the Shubenacadie River in the west, and extends eastward through Hilden to Stewiacke Cross Roads and Eastville. Queens soils occupy the largest single area in the county and cover 70 868 ha or 19.9% of the county.

### Soil characteristics

Under a conifer or mixed wood forest, Queens soils (see Appendix 2, Table 2-14) have 5-10 cm of extremely acidic, poorly decomposed mor. This organic forest litter layer is underlain by 10-30 cm of friable silt loam to clay loam. Below this layer is a firm, coarse, blocky structured Bt horizon, which is characterized by thin clay films on the surface of the soil aggregates. This slowly permeable Bt horizon is 30-50 cm thick, ranges in texture from loam to clay loam, is mottled and gleyed to varying degrees, and grades into a compact, slowly permeable subsoil. The texture of this material ranges from loam and silt loam to sandy clay loam and clay loam and contains more than 18% clay. The coarse fragment content throughout the profile is less than 20% by volume.

Associated soils

Queens soils are associated with the Pugwash, Stewiacke, Westbrook, and Castley soils on the Northumberland Lowlands and with the Pugwash, Woodbourne, Millbrook, Kirkhill, Woodville, Hansford, Truro, Portapique, Folly, Thom, Cobequid, Fash, and Castley soils on the Minas Lowlands.

Soil limitations and use

Soil limitations affecting the use of Queens soils are excess soil water; shallow, compact, very slowly permeable subsoil; and, in some locations, adverse topography. Queens soils are used extensively on the Minas Lowlands for pasture and forage production and are highly productive when properly managed. To eliminate excess soil water from these soils some form of drainage is required.

Map units

Five map units have been established in the Queens Association.

Qu2 (2 areas: 901 ha). Qu2 map units are composed dominantly of imperfectly drained Gleyed Brunisolic Gray Luvisols with significant inclusions of moderately well-drained Podzolic Gray Luvisols and Brunisolic Gray Luvisols. The moderately well-drained soils are found on upper slope positions with good surface drainage. These moderately well-drained soils may have a deeper than average, friable surface material over the compact subsoil. Qu2 map units are non to slightly stony and nonrocky.

Qu3 (113 areas: 23 905 ha). Qu3 map units are composed of imperfectly drained Gleyed Brunisolic Gray Luvisols. These map units are located on mid to upper slopes that have restricted surface drainage, or that receive seepage from upslope or both. Qu3 map units are slow to drain and perched water tables may persist through the spring and early summer and after prolonged rain storms. Qu3 soils units are non to slightly stony and nonrocky.

Qu4 (86 areas: 40 746 ha). Qu4 map units are composed dominantly of imperfectly drained Gleyed Brunisolic Gray Luvisols (Qu3 map units) with significant inclusions of poorly drained Orthic Luvic Gleysols (Qu5 map units). The imperfectly drained soils are located on the mid to upper slopes and the poorly drained soils on lower slopes and in depressions. These map units remain wet for extended periods throughout the growing season. Qu4 map units are non to slightly stony and nonrocky.

Qu5 (92 areas: 5434 ha). Qu5 map units are composed of poorly drained Orthic Luvic Gleysols and are found in depressions and on lower slopes on nearly level and very gently sloping terrain. Qu5 units typically have poor surface drainage and receive excess seepage and runoff from the surrounding upland. Peaty organic surfaces and black spruce - sphagnum forest are commonly associated with these units. Qu5 map units are non to slightly stony and are nonrocky.

Qu6 (18 areas: 783 ha). Qu6 units are composed dominantly of poorly drained Orthic Luvic Gleysols (Qu5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in depressions that receive abundant runoff and seepage and remain saturated throughout the year. Qu6 map units are non to slightly stony and nonrocky.

## RAWDON ASSOCIATION (Ra)

### Parent material and landform

Rawdon soils have developed in 30-60 cm of gravelly sandy loam to gravelly loam over strongly acidic, weakly compacted olive brown to dark yellowish brown, shallow, gravelly sandy loam to very gravelly loam till. The till is derived from Cambrian slates and siltstones and contains from 20-70% coarse fragments by volume.

Rawdon soils are moderately to very stony and non to slightly rocky and are found on undulating to rolling till veneers and thin blankets on nearly level to strong slopes (0.5-30%).

### Location and extent

Soils of the Rawdon Association are found along the southeast border of the county on the Southern Upland and extend along the length of the Wittenburg Mountain ridge from Coldstream to just south of Eastville. Rawdon soils cover 13 583 ha or 3.8% of the county.

### Soil characteristics

Under mixed wood forest, Rawdon soils (see Appendix 2, Table 2-15) have 5-10 cm of poorly decomposed, extremely acidic mor. Underlying this organic mat is 30-60 cm of friable gravelly sandy loam to gravelly loam material. This layer has a gravel and flagstone content of 20-50% and is highly permeable. On till veneers this layer is usually underlain by a firm, moderately permeable subsoil. This subsoil is high in coarse fragments and grades with depth into the underlying bedrock. On thicker till blankets, the subsoil is more compacted and has slower permeability and a lower coarse fragment content.

### Soil limitations and use

Soil limitations for the use of Rawdon soils are stoniness, high content of coarse fragments, high acidity, shallowness to bedrock, and adverse topography. On abandoned farmland, some better-drained Rawdon soils are used for blueberry production. Rawdon soils are mainly forested with balsam fir and red spruce. However, significant stands of sugar maple, red maple, and birch are also found.

## Associated soils

The Rawdon soils are associated with Queens and Perch Lake soils. They differ from Kirkhill soils by the kind of bedrock from which their parent materials have originated. Kirkhill till is derived from Carboniferous shale, whereas Rawdon till is derived from Cambrian slate and siltstone.

## Map units

Five map units have been established for the Rawdon Association.

Ra2 (16 areas: 5927 ha). Ra2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (Ra3 map units). The well-drained soils of these units are commonly located on upper slopes that have good surface drainage. The imperfectly drained soils are located on mid to lower slopes that receive seepage from upslope. These units are moderately to very stony and slightly rocky.

Ra3 (12 areas: 5416 ha). Ra3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols. These units are located on mid to lower slopes that receive seepage from upslope and on gentle slopes that have restricted surface drainage. Ra3 map units are moderately to very stony and nonrocky.

Ra4 (10 areas: 1714 ha). Ra4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols (Ra3 map units) with significant inclusions of poorly drained Orthic Gleysols (Ra5 map units). Ra5 map units are moderately to very stony and nonrocky.

Ra5 (2 areas: 214 ha). Ra5 map units are composed of poorly drained Orthic Gleysols. These units are located in poorly drained depressions and receive seepage and runoff from the surrounding uplands. These units are saturated for extended periods throughout the year and are commonly associated with black spruce - sphagnum forest. Ra5 units are moderately to very stony and nonrocky.

Ra6 (6 areas: 312 ha). Ra6 map units are composed dominantly of poorly drained Orthic Gleysols (Ra5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very poorly drained depressions that receive abundant runoff and seepage keeping them saturated throughout the year. Ra6 map units are moderately to very stony and nonrocky.

## ROSSWAY ASSOCIATION (Ry)

### Parent material and landform

Rossway soils have developed in 30-60 cm of gravelly loam to very gravelly sandy loam over strongly acidic, dark brown, very gravelly sandy loam till. The till is shallow, stony, and derived from basalt.

Rossway soils are moderately stony and non to moderately rocky. They are found on undulating to rolling till veneers on very gentle to very strong slopes (2-45%).

### Location and extent

Soils of the Rossway Association are found at two locations on the Minas Lowlands, on Economy Mountain between Five Islands and Upper Bass River, and west of Upper Bass River. Rossway soils cover 2146 ha or 0.6% of the county.

### Soil characteristics

Under conifer forest, Rossway soils (see Appendix 2, Table 2-16) have 5-10 cm of moderately decomposed, very strong acidic moder. Underlying this surface organic material is 30-60 cm of friable, highly permeable, gravelly loam to very gravelly sandy loam. The A and upper B horizons within this mineral layer are commonly rich in organic matter. The coarse fragment content in this material ranges from 20-70% by volume and is composed of angular basalt gravels and cobbles. A weakly compacted subsoil or basalt bedrock underlies the upper friable layer. Bedrock is commonly within 1 m of the surface.

### Soil limitations and use

The limitations to use of Rossway soils are stoniness, shallowness to bedrock, high acidity, adverse topography, and high content of coarse fragments. Most Rossway soils support forests of spruce and fir with lesser amounts of hardwood species.

### Associated soils

The Rossway soils are associated primarily with Queens and Portapique soils.

### Map units

Three map units have been established for the Rossway Association.

Ry1 (8 areas: 1459 ha). Ry1 map units are composed of rapid to well-drained Sombric and Orthic Ferro-Humic Podzols and Sombric and Orthic Humo-Ferric Podzols and are located on upper slopes and hilltops having good surface and internal drainage. These map units are moderately stony and moderately rocky.

Ry2 (2 area: 169 ha). Ry2 map units are composed dominantly of rapid to well-drained Sombric and Orthic Humo-Ferric Podzols and Sombric and Orthic Ferro-Humic Podzols with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Ferro-Humic Podzols. These units are located on mid to lower slopes that receive seepage and on very gently sloping areas where perched water tables are maintained by the underlying bedrock. Ry2 map units are moderately stony and moderately rocky.

Ry4 (1 area: 518 ha). Ry4 map units are dominantly composed of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Ferro-Humic Podzols with significant inclusions of poorly drained Orthic Gleysols. These units are located on lower seepage slopes and in depressions that receive runoff and seepage water from the surrounding uplands. Ry4 map units are moderately stony and nonrocky.

## STEWIACKE ASSOCIATION (Se)

### Parent material and landform

Stewiacke soils have been developed in strongly acidic, silt loam to silty clay loam alluvium. Stewiacke soils are commonly stratified and may contain thin layers of coarser-textured alluvium.

Stewiacke soils are located on floodplains adjacent to rivers and streams on level to very gentle slopes (<0.5%) in valley bottoms and lowland areas. Stewiacke soils are nonstony and nonrocky and flood annually.

### Location and extent

Stewiacke soils are found adjacent to slow-flowing, meandering rivers and streams in areas of low relief where the adjacent upland soils have high clay and silt content. Stewiacke soils are found throughout the county with the largest area occurring in the Stewiacke River valley. The Stewiacke Association covers 10 931 ha or 3.1% of the county.

### Soil characteristics

Stewiacke soils, like Cumberland soils, are young and show little profile development see (Appendix 2, Table 2-17). Typically they have 60-100 cm of friable to firm silt loam to silty clay loam over coarser-textured stratified sediments.

Under floodplain vegetation, Stewiacke soils have a wide range in the depth and kind of organic surface layers. Imperfectly drained soils that are less prone to sedimentation by flooding have thin moderately well- to well-decomposed mull and moder underlain by Ah horizons rich in humus. Poorly drained soils under sedge vegetation have moderately decomposed peaty Om horizons less than 40 cm thick. Under forest or scrub vegetation poorly drained soils have moderately decomposed organic surface horizons of variable thickness commonly underlain by mineral Ah horizons rich in humus.

The upper mineral material has a moderate to slow permeability, which restricts the percolation and internal movement of water through the soil. This condition is aggravated by high water tables that persist in Stewiacke soils during wetter periods. These high water tables are maintained by seepage and runoff from upland areas and by high water levels in the adjacent streams and rivers during those wetter periods. Flood waters deposit nutrients on alluvial soils and counter the adverse effects of leaching. This process leaves Stewiacke soils relatively more fertile than natural upland soils.

### Associated soils

On the Northumberland and Minas lowlands, Stewiacke soils are associated with Queens, Pugwash, and Castley soils. In the Stewiacke Valley, Stewiacke soils are associated with Fash and Acadia soils. Near Stewiacke East, Stewiacke and Acadia soils blend and become inseparable.

### Soil limitations and use

The limitations to the use of Stewiacke soils are excess soil water, flooding, slow permeability, and high clay and silt content. Cold air draining from the uplands can create frost pockets over Stewiacke soils. Even with these limitations Stewiacke soils are relatively productive soils for agriculture, when intensively managed. Most Stewiacke soils suited for agriculture are used for forage production or pasture. Some areas are used for growing grain and silage corn.

### Map units

Four map units have been established for the Stewiacke Association.

Se3 (5 areas: 307 ha). Se3 map units are composed of imperfectly drained Gleyed Regosols, Gleyed Cumulic Regosols, and Gleyed Humic Regosols. These units remain wet for extended periods during the beginning and end of the growing season and after prolonged rain. Se3 map units are nonstony and nonrocky.

Se4 (32 areas: 3193 ha). Se4 map units are composed dominantly of imperfectly drained Gleyed Regosols, Gleyed Cumulic Regosols, and Gleyed Humic Regosols with significant inclusions of poorly drained Rego Gleysols and Rego Humic Gleysols (Se5 map units). Se4 map units are nonstony and nonrocky.

Se5 (51 areas: 2824 ha). Se5 map units are composed of poorly drained Rego Gleysols and Rego Humic Gleysols. Se5 units are located in depressions that pond runoff and remain wet for most of the growing season. These units are nonstony and nonrocky.

Se6 (30 areas: 4742 ha). Se6 map units are composed dominantly of poorly drained Rego Gleysols and Rego Humic Gleysols (Se5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very poorly drained depressions and remain saturated for most of the year. Se6 map units are nonstony and nonrocky.

## THOM ASSOCIATION (Tm)

### Parent material and landform

Thom soils have developed in 60-80 cm of gravelly sandy loam to gravelly silt loam over compact, strongly acidic, dark brown gravelly loam to gravelly sandy loam till. The till is derived from hard, sedimentary and metamorphic rocks. The gravel, cobble, and flagstone content of the till ranges from 20-50% by volume.

Thom soils are moderately to very stony and non to slightly rocky and are found on undulating, rolling, and hummocky till blankets and veneers on nearly level to strong slopes (0.5-30%).

### Location and extent

In the Cobequid Upland, Thom soils are found around Economy and Gamble Lake. In the northeastern part of the Minas Lowlands, Thom soils are found extensively from the southern edge of the Cobequid Upland south to Smithfield and Eastville. Thom soils cover 25 573 ha or 7.2% of the county.

### Soil characteristics

Under forest vegetation, Thom soils (see Appendix 2, Table 2-18) have 4-10 cm of extremely acidic, poorly decomposed mor. This organic layer is underlain by 60-80 cm of friable gravelly sandy loam to gravelly loam. This layer contains 20-50% hard gravels, cobbles, and flagstones. The underlying subsoil is a compact, gravelly loam to gravelly sandy loam with moderate to moderately low permeability. Coarse fragments in the subsoil range from 20-50% gravels, cobbles, and stones.

Soils on upper slope positions and steep slopes are mostly shallower to bedrock, have greater gravel contents, and are stonier than soils located on mid to lower slope positions and on gently sloping terrain. Soils on mid to lower slopes, which receive seepage and runoff, and soils with poor surface drainage, commonly have perched water tables that persist for extended periods during the wetter months.

### Associated soils

Thom soils are associated with Cobequid, Westbrook, and Hebert soils on the Cobequid Upland and with the Woodbourne, Millbrook, Diligence, and Hebert soils on the Minas Lowlands.

### Soil limitations and use

The limitations for the use of Thom soils are adverse topography, stoniness, low fertility, high acidity, high content of coarse fragments, and excess soil water. On some abandoned farmland, better-drained Thom soils are being used for blueberry production. Thom soils are mainly forested with mixed hardwood and softwood stands, which are harvested for pulp, saw logs, and fire wood.

### Map units

Six map units have been established for the Thom Association.

Tm1 (9 areas: 435 ha). Tm1 map units are composed of well-drained Orthic Humo-Ferric Podzols. These units are very stony and slightly rocky and are found on upper slope positions and on steep slopes.

Tm2 (26 areas: 6341 ha). Tm2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols (Tm1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (Tm3 map units). Tm2 units are located on mid to upper slopes and are very stony and slightly rocky.

Tm3 (45 areas: 9362 ha). Tm3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols. Tm3 map units are located on mid to lower slopes that receive seepage and runoff and on gentle slopes that have perched water tables caused by slowly permeable subsoils. Tm3 map units are very stony and nonrocky.

Tm4 (12 areas: 4756 ha). Tm4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols (Tm3 map units) with significant inclusions of poorly drained Orthic Gleysols (Tm5 map units). Tm4 map units are located on lower slope positions and in depressions that receive seepage and runoff from the surrounding uplands. These map units are moderately stony and nonrocky.

Tm5 (19 areas: 3477 ha). Tm5 map units are composed of poorly drained Orthic Gleysols and are located in depressions that receive seepage and runoff from the surrounding upland. These map units remain saturated for extended periods throughout the growing season. Tm5 map units are moderately stony and nonrocky.

Tm6 (5 areas: 1202 ha). Tm6 map units are composed dominantly of poorly drained Orthic Gleysols (Tm5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very poorly drained depressions and remain saturated throughout the year. Tm6 map units are moderately stony and nonrocky.

## TRURO ASSOCIATION (Tu)

### Parent material and landform

Truro soils have developed in 60-80 cm of loamy sand to sandy loam over very friable to firm, very strongly acidic, red to reddish brown, glaciofluvial sands and loamy sands. The coarse fragment content of the material is typically less than 5% by volume.

Truro soils are nonstony and nonrocky and are found on undulating to rolling plains on nearly level to very strong slopes (2-45%).

### Location and extent

Truro soils are found on the Minas Lowlands from Portapique on the north side of Cobequid Bay east to Valley Station. On the south side of the bay they extend from Valley Station west to Beaver Brook. Soils of the Truro Association cover 8555 ha or 2.4% of the county.

### Soil characteristics

Under mixed wood or conifer forest, Truro soils (see Appendix 2, Table 2-19) have less than 5 cm of extremely acidic, poorly decomposed mor. This organic mat overlies 60-80 cm of very friable, highly permeable, loamy sand to sandy loam that grades into a sand or loamy sand subsoil. The subsoil characteristics range from loose and highly permeable for the well-drained soils to slightly compact or cemented and moderately to slowly permeable for the imperfectly and poorly drained soils. Cemented fragipan subsoils are usually underlain at some depth by loose sandy material. Cemented B horizons (ortstein) occur in a few places and where present are usually discontinuous. Ortstein layers can be found in all drainage classes of the Truro Association but where found are more pronounced in imperfect and poorly drained soils.

### Soil limitations and use

The limitations for use of the Truro soils are high acidity, low fertility, high erodibility, undesirable structure, and restricted permeability in most of the imperfectly and poorly drained soils.

Truro soils are predominantly covered by forest and support mixed and pure stands of spruce, fir, pine, birch, and maple. The imperfectly and poorly drained soils support forest stands consisting mainly of red and black spruce, fir, and tamarack. Truro soils are used for agricultural production of a wide range of crops and are highly productive under good management.

### Associated soils

Truro soils are associated with Woodville, Queens, Diligence, Woodbourne, Folly, Portapique, Thom, Hansford, Hebert, Cumberland, and Acadia soils. As the clay content of the subsoil increases, Truro soils grade into Woodville soils.

## Map units

Five map units have been established for the Truro Association.

Tu1 (49 areas: 3917 ha). Tu1 map units are composed of well- and rapidly drained Orthic Humo-Ferric Podzols. These map units contain soils that are very friable, deep, and highly permeable. These map units are nonstony and nonrocky.

Tu2 (22 areas: 2505 ha). Tu2 map units are composed dominantly of well- and rapidly drained Orthic Humo-Ferric Podzols (Tu1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Ortstein or Fragic Humo-Ferric Podzols (Tu3 map units). These units are nonstony and nonrocky.

Tu3 (23 areas: 1524 ha). Tu3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Ortstein or Fragic Humo-Ferric Podzols. Soils in these map units have compact and slowly permeable subsoils and are found on very gentle slopes and on lower slopes that receive seepage and runoff from surrounding uplands. These map units are nonstony and nonrocky.

Tu4 (5 areas: 342 ha). Tu4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Ortstein or Fragic Humo-Ferric Podzols (Tu3 map units) with significant inclusions of poorly drained Orthic Gleysols (Tu5 map units). These map units are nonstony and nonrocky.

Tu5 (7 areas: 267 ha). Tu5 map units are composed of poorly drained Orthic Gleysols. These map units are found in depressions that collect seepage and runoff from surrounding uplands. These map units remain saturated for most of the growing season. Tu5 map units are usually associated with a black spruce - sphagnum moss forest and are nonstony and nonrocky.

## WESTBROOK ASSOCIATION (Wb)

### Parent material and landform

Westbrook soils have developed in 50-70 cm of gravelly sandy loam to gravelly loam over compact, strongly acidic, dusky red, gravelly sandy loam to very gravelly sandy loam till. The till is shallow and is derived from purplish Devonian conglomerate; it contains 20-60% hard rounded gravels and cobbles.

Westbrook soils are slightly to moderately stony and non to slightly rocky. They are found on hummocky to rolling till veneers and thin blankets on very gentle to strong slopes (2-30%).

## Location and extent

Westbrook soils are found in two distinct areas along the north side of the Cobequid Upland. The western area continues from Cumberland County and runs in a narrow continuous belt east to Warwick Mountain. The largest area of Westbrook soils extends from Central New Annan east to the Pictou County border. Soils of the Westbrook Association cover 6725 ha or 1.9% of the county.

## Soil characteristics

Under forest vegetation Westbrook soils (see Appendix 2, Table 2-20) have 4-15 cm of poorly decomposed mor underlain by 50-70 cm of friable gravelly sandy loam to gravelly loam. The shallow Westbrook soils are underlain by porous, weakly compacted subsoil, which grades into weathered conglomerate bedrock. A distinguishing characteristic of Westbrook soils is the purplish subsoil color inherited from the underlying comglomerate bedrock. Shallow Westbrook soils are commonly located on the hilltops and in steep-sided valleys and ravines. On gentle slopes, the soils are deeper and the till is compact and moderately permeable and may contain fewer gravels and cobbles than the shallower soils. Soils with compact subsoils located on lower and on gentle slopes commonly have perched water tables during wetter periods. Soils on steep lower slopes and in valley bottoms commonly receive seepage from upslope and are saturated during wet periods.

## Soil limitations and use

Limitations for the use of Westbrook soils are shallowness to bedrock, adverse topography, high content of coarse fragments, acidity, and low fertility. Westbrook soils that have been cleared and have had the surface stones removed are used for pasture and hay production. On some abandoned fields, the better-drained Westbrook soils are used for blueberry production. Westbrook soils are mainly forested with birch, sugar maple, red maple, and beech. Significant stands of red spruce and balsam fir are also found on these soils. Forests on Westbrook soils are harvested for lumber, pulp, and fire wood.

## Associated soils

The Westbrook soils are associated with Wyvern, Cobequid, Queens, Pugwash, Hebert, and Cumberland soils.

## Map units

Four map units have been established for the Westbrook Association.

Wb1 (30 areas: 4486 ha). Wb1 map units are composed of well-drained Orthic Humo-Ferric Podzols. These map units are found on the shallow, porous, till veneers located on hilltops and on steep, upper slopes. Wb1 map units are moderately stony and slightly rocky.

Wb2 (10 areas: 1772 ha). Wb2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols (Wb1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols (Wb3 map units). Wb2 map units are moderately stony and slightly rocky.

Wb3 (7 areas: 323 ha). Wb3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols located on lower slopes and on gentle sloping terrain with restricted surface drainage. Wb3 map units are slightly to moderately stony and nonrocky.

Wb4 (1 area: 144 ha). Wb4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols (Wb3 map unit) with significant inclusions of poorly drained Orthic Gleysols. These units are located on lower slopes and in depressions that receive seepage and runoff from upslope. Wb4 map units are slightly to moderately stony and nonrocky.

## WOODBOURNE ASSOCIATION (Wo)

### Parent material and landform

Woodbourne soils have developed in 50-70 cm of gravelly loam to gravelly sandy loam over compact, very strongly acidic, dark reddish brown, gravelly loam to gravelly clay loam till. The till is derived from reddish brown and purplish Horton sandstone and shale and contains 20-35% gravels, cobbles, and stones by volume.

Woodbourne soils are moderately stony and nonrocky and are found on undulating to rolling till blankets on nearly level to very steep slopes (0.5-45%).

### Location and extent

Soils of the Woodbourne Association are found on the Minas Lowlands in one large area surrounding Harmony, Camden, and Greenfield. Woodbourne soils cover 15 014 ha or 4.2% of the county.

### Soil characteristics

Under forest vegetation, Woodbourne soils (see Appendix 2, Table 2-21) have 5-10 cm of extremely acidic, poorly decomposed mor. Under this organic layer is 50-70 cm of friable, gravelly loam to gravelly sandy loam, which ranges in gravel content from 20-45%. Beneath this friable layer is compact, slowly permeable subsoil. This material ranges in texture from gravelly loam to gravelly clay loam and has a clay content of 18% or more and a coarse fragment content of 20-35% by volume. On level to very gently sloping terrain the subsoil causes perched water tables to persist near the surface during wet periods.

## Soil limitations and use

Soil limitations for the use of Woodbourne soils are stoniness, high acidity, excess soil water, slow permeability in the subsoil, and adverse topography. Where the soils have been cleared for agriculture they are used for forage and pasture. Most Woodbourne soils are forested with hardwood and mixed wood stands on the better-drained areas and with softwoods on the poorer-drained areas.

## Associated soils

Woodbourne soils are associated with Queens, Millbrook, Truro, Thom, and Hebert soils. As the coarse fragment content and stoniness of Woodbourne soils decreases they grade into Queens soils. As the clay content of the subsoil material drops below 18% and the coarse fragment content increases, Woodbourne soils grade into Thom soils.

## Map units

Six map units have been established for the Woodbourne Association.

Wo2 (16 areas: 3968 ha). Wo2 map units are composed dominantly of moderately well-drained Orthic Humo-Ferric Podzols with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols (Wo3 map units). Wo2 map units are moderately stony and nonrocky.

Wo3 (13 areas: 7830 ha). Wo3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols. These soils have slowly permeable subsoils and only moderate surface drainage. Wo3 map units are found on upper, middle, and lower slopes. Seepage is persistent in soils situated on mid to lower slopes during the wetter periods. The soils in Wo3 map units are slow to dry and usually remain moist throughout the growing season. Wo3 map units are moderately stony and nonrocky.

Wo4 (16 areas: 2714 ha). Wo4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Gleyed Brunisolic Gray Luvisols (Wo3 map units) with significant inclusions of poorly drained Orthic Gleysols and Orthic Luvic Gleysols (Wo5 map units). These units are located on lower slopes positions and in depressions that receive seepage and runoff from the surrounding uplands. These units are moderately stony and nonrocky.

Wo5 (5 areas: 263 ha). Wo5 map units are composed of poorly drained Orthic Gleysols and Orthic Luvic Gleysols and are located in wet depressions and on lower and gentle slopes with poor surface drainage. These map units are saturated for extended periods throughout the year and are commonly associated with peaty organic surfaces and black spruce - sphagnum moss forest. Wo5 map units are moderately stony and nonrocky.

Wo6 (6 acres: 239 ha). Wo6 map units are composed dominantly of poorly drained Orthic Gleysols and Orthic Luvic Gleysols with significant inclusions of the very poorly drained organic soils of the Castley Association. Wo6 map units are located in wet depressions that receive abundant runoff and seepage and remain saturated throughout the year. Wo6 map units are moderately stony and nonrocky.

## WOODVILLE ASSOCIATION (Wd)

### Parent material and landform

Woodville soils have developed in 40-60 cm of sandy loam over firm, very strongly acidic, reddish brown sandy loam till. The till is derived from soft, red, Triassic sandstone and contains less than 20% coarse fragments by volume.

Woodville soils are non to slightly stony, nonrocky and are found on undulating to rolling till blankets on nearly level to strong slopes (0.5-30%).

### Location and extent

Woodville soils are found in a discontinuous strip just north of Cobequid Bay on the Minas Lowlands. This strip extends from Five Islands in the west to Manganese Mines in the east. The largest single area of Woodville soils lies between Belmont and Truro. Woodville soils cover 14 890 ha or 4.2% of the county.

### Soil characteristics

Under a mixed wood forest, Woodville soils (see Appendix 2, Table 2-22) have 5-15 cm of poorly decomposed, extremely acidic mor. Underlying this organic mat are 40-60 cm of friable, sandy loam over a firm subsoil, which may exhibit very weak to moderate fragipan development. The fragipan layer is distinguished by coarse platy structure and vertical, pale gray fracture planes. This fragic horizon is absent or poorly developed in well-drained soils but commonly well developed in imperfectly and poorly drained soils. The restricted internal drainage caused by this cemented, slowly permeable layer results in perched water tables and seepage spots on lower slopes. Coarse fragment content throughout the soil profile is less than 20% by volume.

### Soil limitation and use

Limitations for the use of Woodville soils are high acidity, low fertility, and excess soil water in the imperfectly and poorly drained soils. For agriculture, these limitations can be corrected by the installation of subsurface drainage and by the application of fertilizers, lime, and organic matter.

Well-drained Woodville soils are among the best agricultural soils in the county and are well suited for a wide range of crops. They are used primarily for the production of forage and, to a lesser extent, for small grains and corn. Most Woodville soils are forested and support mixed wood stands of spruce, fir, hemlock, tamarack, pine, maple, birch, and aspen.

Associated soils

Woodville soils are associated primarily with the Truro, Diligence, Portapique, and Queens soils. As the clay content of the subsoil increases to 18%, Woodville soils grade into Queens soils. As the texture of the subsoil material grades from sandy loam to loamy sand and sand, Woodville soils grade into Truro soils.

Map units

Six map units have been established for the Woodville Association.

Wd1 (59 areas: 2801 ha). Wd1 map units are composed of well-drained Orthic Humo-Ferric Podzols. These soils have good surface drainage, deep friable upper soils material, and subsoils with moderate permeability. Wd1 map units are non to slightly stony and nonrocky.

Wd2 (32 areas: 3688 ha). Wd2 map units are composed dominantly of well-drained Orthic Humo-Ferric Podzols (Wd1 map units) with significant inclusions of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Wd3 map units). These map units are non to slightly stony and nonrocky.

Wd3 (41 areas: 4021 ha). Wd3 map units are composed of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols. Soils in these map units have subsoils that are compact, slowly permeable, and usually fragic. These units are located on level, mid or lower slopes and have persistent perched water tables, or receive seepage from upslope, or both. Wd3 map units are non to slightly stony and are nonrocky.

Wd4 (16 areas: 3637 ha). Wd4 map units are composed dominantly of imperfectly drained Gleyed Humo-Ferric Podzols and Fragic Humo-Ferric Podzols (Wd3 map units) with significant inclusions of poorly drained Orthic Gleysols (Wd5 map units). These units are located on nearly level slopes with poor surface drainage and on lower slopes that receive runoff and seepage from upslope. Wd4 map units are non to slightly stony and are nonrocky.

Wd5 (19 areas: 658 ha). Wd5 map units are composed of poorly drained Orthic Gleysols and are located in poorly drained depressions that receive runoff and seepage from the adjacent uplands. Wd5 map units remain wet for extended periods during the growing season and are usually associated with black spruce - sphagnum moss forests. These units are non to slightly stony and nonrocky.

Wd6 (3 areas: 95 ha). Wd6 map units are composed dominantly of poorly drained Orthic Gleysols (Wd5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These map units are located in very poorly drained depressions and remain wet throughout the year. Wd6 map units are nonstony to slightly stony and nonrocky.

## WYVERN ASSOCIATION (Wn)

### Parent material and landform

Wyvern soils have developed in 60-80 cm of gravelly sandy loam to very gravelly sandy loam over compact, strongly acidic, yellowish brown, gravelly sandy loam to very gravelly loamy sand till. The till is shallow and stony and is derived primarily from granite. Gravel, cobble, and stone content of the till ranges from 20-70% by volume.

Wyvern soils are very to excessively stony and slightly to moderately rocky. They are found on rolling to hummocky till veneers and shallow blankets on nearly level to very strong slopes (0.5-45%).

### Location and extent

Wyvern soils are found in two locations on the Cobequid Upland. One area is on the southwestern side of the upland from Economy Lake to the Cumberland County border. The largest portion of Wyvern soils is situated in the northwestern section of the Cobequid Upland and extends from the Cumberland County border to the Pictou County border. Wyvern soils cover 46 186 ha or 13.0% of the county.

### Soil characteristics

Under forest vegetation Wyvern soils (see Appendix 2, Table 2-23) have 5-15 cm of extremely acidic, poorly decomposed mor. Underlying this surface organic layer are 60-80 cm of friable gravelly to very gravelly sandy loam material that contains 20-70% gravels, cobbles, and stones. This material is underlain by granite bedrock or compacted till subsoil of variable depth. The compact subsoil is moderately rapid to rapidly permeable because of its high content of sand and coarse fragments. During wetter periods, persistent perched water tables occur in imperfect and poorly drained soils that are shallow to bedrock and located on gently sloping topography. Imperfectly drained soils are also located at the bottom of long slopes that receive persistent seepage from upslope.

### Soil limitations and use

Soil limitations for the use of Wyvern soils are excessive stoniness and coarse fragment content, high acidity, shallowness to bedrock, and adverse topography. Wyvern soils are predominately forested with hardwood stands of sugar maple, red maple, birch, and beech. Softwood stands of spruce, fir, and tamarack predominate on the imperfectly and poorly drained soils. Some better-drained Wyvern soils on abandoned farmland are used for blueberry production.

### Associated soils

The Wyvern soils are associated with the Cobequid, Hebert, Cumberland, and Westbrook soils on the Cobequid Upland and with the Portapique, Pugwash, and Queens soils on the border between the upland and the lowlands.

### Map units

Six map units have been established for the Wyvern Association.

Wn1 (78 areas: 23 545 ha). Wn1 map units are composed of rapidly to well-drained Orthic Ferric-Humic Podzols and Orthic Humo-Ferric Podzols. These units are found on hilltops, upper slopes, steep slopes, and hummocky terrain with good surface drainage. These units are very to excessively stony and slightly to moderately rocky.

Wn2 (56 areas: 12 408 ha). Wn2 map units are composed dominantly of rapidly to well-drained Orthic Ferro-Humic Podzols and Orthic Humo-Ferric Podzols (Wn1 map units) with significant inclusions of Gleyed Ferro-Humic Podzols and Gleyed Humo-Ferric Podzols (Wn3 map units). Wn2 map units are very to excessively stony and slightly to moderately rocky.

Wn3 (28 areas: 5971 ha). Wn3 map units are composed of imperfectly drained Gleyed Ferro-Humic Podzols and Gleyed Humo-Ferric Podzols. These units are located on lower slopes, in depressions on gently sloping hummocky terrain, on lower positions of steep slopes, and in ravine bottoms that are kept saturated by seepage during wetter periods. Wn3 units are very to excessively stony and slightly to moderately rocky.

Wn4 (11 areas: 2604 ha). Wn4 map units are dominantly composed of imperfectly drained Gleyed Ferro-Humic Podzols and Gleyed Humo-Ferric Podzols (Wn3 map units) with significant inclusions of poorly drained Orthic Gleysols (Wn5 map units). These units are located in slowly drained depressions and on very gentle lower slopes that receive runoff and seepage from upslope. These units are very to excessively stony and slightly rocky.

Wn5 (13 areas: 1536 ha). Wn5 map units are composed of poorly drained Orthic Gleysols. These units are located in poorly drained depressions that are saturated for most of the year. These units are commonly associated with black spruce - sphagnum forest and are very to excessively stony and slightly rocky.

Wn6 (4 areas: 122 ha). Wn6 map units are composed dominantly of Orthic Gleysols (Wn5 map units) with significant inclusions of very poorly drained organic soils of the Castley Association. These units are located in very poorly drained depressions that receive abundant runoff and seepage from the surrounding uplands and remain saturated throughout the year. Wn6 map units are very to excessively stony and slightly rocky.

## MISCELLANEOUS LAND TYPES

### Coastal beach (Cb)

Two areas of coastal beach have been mapped along the Bay of Fundy coastline, one at Portapique Beach and the other at the cove of Upper Economy. These map units are composed of gravel and sand beach deposits.

Salt-tolerant vegetation grows sparsely in small patches, and most of the areas lack vegetation. Coastal beaches are rapidly drained, non to slightly stony, and nonrocky. They cover 37 ha or 0.01% of the county.

### Salt marsh (SM)

Salt marshes consist of grayish brown silty clay loam marine sediments deposited along the coastline by the tides at the mouths of creeks and rivers. They are continuously reworked by the tides along shores of the Northumberland Strait and Cobequid Bay. Salt marshes are most extensive along the shore of Cobequid Bay where they are associated with the Acadia soils. Salt marsh deposits are alkaline and saline.

Salt marshes are stone free and are partially stabilized by salt-tolerant glasswort, salt-grass, sand spurrey, sea-blite, sea rocket, and spike grass. Salt marshes are very poorly drained, nonstony and nonrocky and cover 1136 ha or 0.3% of the county.

Early in the history of Colchester County, marsh mud was excavated during the winter and was spread on the adjacent coarse-textured Hebert soils to improve their fertility and moisture-holding capacity.

## PART 4. SOIL INTERPRETATIONS FOR VARIOUS USES

This section presents interpretations of soils by map units for use in agriculture, community development, forestry, and as a source of construction material.

Most of the interpretations included here categorize, into a tabular format, soil characteristics that are important for specific uses. The soil map units are then rated to show the degree of suitability or potential for the specific use. The ratings reflect the ease or difficulty of overcoming soil conditions for the specific use with present-day technology. Four classes of soil suitability are utilized.

Good (G). Soils are relatively free of problems or the limitation can be easily overcome. The soils have properties that are suitable for the use proposed. Crop yields are high, standard management or installation and design methods are acceptable, and costs of development or maintenance are not higher because of soil conditions.

Fair (F). Limitations exist but they can be overcome with good or special management and careful design. The soils are basically acceptable for the proposed use but have one or more properties that are incompatible with the use intended. Development and maintenance costs are greater than for lands rated as Good.

Poor (P). Limitations are severe enough to make use questionable because of costs of overcoming them or of continuing problems expected with such use. Costs of development and maintenance can be expected to be higher than for soils rated as Good or Fair. The effects on the environment of utilizing these soils for the intended use can be significant. These soils are very difficult to bring into use.

Unsuitable (U). Soils are unsuited to the proposed use because they have one or more properties that are so restrictive that development is impractical. Development or maintenance costs or both are prohibitive. Inputs required to use these soils are too great to justify the efforts under existing conditions. Very significant damage to the environment would probably result if these soils were used for the proposed purpose.

Guideline tables listing the soil and land characteristics or factors used to determine the interpretive ratings are presented for vegetable crops, alfalfa, spring cereals, winter wheat, on-site sewage disposal systems, housing, area-type sanitary landfill, local roads and streets, sewage lagoons, forestry road construction, off-road use of harvesting equipment, and windthrow hazard; and for sources of topsoil, gravel, and roadfill. Definitions for the codes and abbreviations used in the interpretative guideline tables can be found in Appendix 3.

Graphic methods are used to interpret for erosion susceptibility and tree species to plant.

These interpretations are intended as a guide for general planning purposes only and do not eliminate the need for on-site inspections. When using information in this report, allowance must be made for the scale of the map, which prevents areas smaller than approximately 25 ha to be shown. Interpretations of compound map units are reported for both the dominant and significant soil components only if they differ from each other.

These ratings are based only on soil and landscape criteria. The soil rating indicates the degree of suitability if the soil were used without corrective or precautionary measures. Socioeconomic factors are not considered. The size, shape, and location of a soil map unit is not taken into consideration when it is evaluated for a particular use.

The degree of suitability (good, fair, poor, and unsuitable) are determined by the most restrictive rating assigned to any of the listed soil properties. For example, if the degree of suitability is "good" for all but one soil property, and that property has a degree of suitability of "poor," then the overall rating of the soil for that given use is "poor." However, the degree of suitability of the individual soil properties can have a cumulative effect. This applies only to the suitability ratings "fair" and "poor." If the most severe rating of all the soil properties is "fair," but three or more properties are rated as such, then the overall rating for the soil is downgraded to "poor." The same applies to downgrading "poor" to "unsuitable." In these situations the cumulative affect is indicated by the use of "x" as the limitation symbol.

The limitation symbol is located in parentheses in each interpretive guideline table for each soil factor. The symbols are used with each rating in the interpretive rating tables (see Tables 9, 15, 19, and 23) to indicate the specific soil and landscape factor(s) that would limit the performance of a soil for the rated use.

## AGRICULTURE

Soil interpretations for agriculture include:

(1) CLI Agriculture capability class; a nationwide classification system developed for the Canada Land Inventory (CLI) (Department of the Environment 1972).
(2) Suitability for vegetables, for alfalfa, for spring cereals, and for winter wheat.

These ratings are best judgments only and are subject to change. The practice of proper management and the maintenance of adequate soil fertility levels is assumed.

## CLI soil capability classification

The mineral soils are divided into seven classes according to increasing limitation for agricultural use. Classes 1, 2, and 3 soils are considered capable of sustained production of common field crops, whereas Class 4 soils are considered marginal for this use. Soils in Class 5 are capable of use only for permanent pasture and hay. Class 6 soils are capable of use for wild pasture only, a condition in which perennial forage crops can be maintained without improvement practices. This condition is rarely obtainable in Colchester County, therefore Class 6 has not been used. Class 7 soils are considered incapable of use for arable culture or permanent pasture. Tree fruits, blueberries, cranberries, and ornamental plants are excluded from this interpretation because they are not considered as cultivated or common field crops.

Subclasses are divisions within classes that have the same kind of limitation for agricultural use. Climate, soil, and landscape limitations used in Colchester County are as follows:

(C) adverse regional climate
(M) inadequate soil moisture holding capacity
(D) poor structure and permeability
(T) unfavorable topography
(P) excess surface stoniness
(R) shallowness to bedrock
(I) inundation or flooding hazard
(W) excess soil water excluding inundation
(F) low fertility
(X) cumulative adverse characteristics.

## Vegetable crops

Because of the variability in soil requirements of vegetable crops, the rating of soils for such production can only be generalized. Soils with a "good" suitability rating are relatively free of constraints to the production of a wide variety of vegetable crops. On average, vegetable crops require better soil qualities than do general field crops. These interpretive ratings are not applied to organic soils, because, in general, insufficient information on such areas precludes interpretive judgment.

Production for early markets is not used as a rating criteria. However, suitability deals with the soil's capacity to produce vegetable crops on a viable commercial basis. Home gardening is a different matter. Family gardens are relatively small in size, receive more intensive soil management, and most important, are not governed by the "produce or else" profit aspect of business. Although the interpretations for vegetable crops can be used as a guide to locate soil units most suitable for home gardens, relatively suitable plots can usually be found or established within the boundaries of even the poorer grade soils (Wang and Rees 1983).

Table 5 outlines criteria used in rating soils for vegetable crops.

## Alfalfa

Alfalfa has potential in the Atlantic region and has some definite advantages over other forages (Atlantic Field Crops Committee 1980). Soil factors play an important part in the survival of this crop, as alfalfa is a deep-rooting plant with high water requirements (Dube 1981). Alfalfa is susceptible to winter kill by frost heaving or by smothering that occurs when the plants are covered by ice sheets for prolonged periods. Alfalfa has a low tolerance to flooding during the growing season and a few consecutive days of inundation can have serious results.

Guidelines for assessing the soil limitations for alfalfa are presented in Table 6.

## Spring cereals

The common spring cereal grains, barley, oats, wheat, and rye are generally adapted to climatic conditions existing in the Atlantic Region and higher yields are normally obtained during cool, moist seasons. One key to successful growing of spring grain in the region is early seeding (Atlantic Field Crops Committee 1980). Good drainage greatly facilitates early seeding and is one of the most important soil factors considered in the soil limitation guidelines for spring cereals presented in Table 7.

## Winter wheat

Winter wheat offers some advantages over spring-grown cereals. It matures early reducing the losses that may arise from unfavorable fall weather. Winter wheat usually outyields spring wheat and provides a method of erosion control for land normally left unprotected over winter. The planting of winter wheat gives farmers more flexibility in their operations (Sanderson and Walker 1980). Winter wheat requires good surface and internal soil drainage and excess soil moisture is detrimental to its growth (Dube 1981).

Winter wheat, like alfalfa, is subject to winter kill, and plants can be damaged by ice sheets and frost heave. The soil conditions that contribute to these damaging processes have been considered in Table 8, which outlines the guidelines used in determining the soil limitations for winter wheat.

Table 9 presents, for each map unit, the complete soil interpretations for agriculture.

Table 5. Soil suitability for vegetable crops[1]

| Soil factors[2] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth of friable soil, cm (d) | >50 | 20-50 | --- | <20 |
| Permeability of subsoil, cm/h (k) | >0.5 | 0.1-0.5 | <0.1 | --- |
| Flooding (i) | none | occasional | frequent | very frequent |
| Stoniness[3] (p) | 0-1 | 2 | 3 | 4-5 |
| Rockiness (r) | 0 | 1 | --- | 2-5 |
| Slope, % (t) | <2 | 2-5 | 5-9 | >9 |
| Drainage[3,4] (w) | W,MW,R | I | P | VP |
| Texture, average of friable soil (m) | L,SL,SiL<br>LS,S | (SCL,CL,SiCL<br>GCL,GSCL<br>GSiCL)[5]<br>GSL,GL,GSiL | VGSL,VGSiL<br>VGL,GS,GLS | VGS,VGLS<br>SiC |

Sources: Department of the Environment 1972, Wang and Rees 1983, Webb et al. 1989.

[1] Irrigation is assumed.

[2] Soil factor class codes are defined in Appendix 3.

[3] Day 1983.

[4] Improve by one drainage class where tile drainage is feasible, for all soil conditions except the following: <2% slope; organic soils; <100 cm to bedrock; rockiness classes 2-5; stoniness classes 4-5; and where frequent flooding by rivers, lakes, and streams occurs.

[5] Downgrade one class if drainage is imperfect.

Table 6. Soil suitability for alfalfa

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth of friable soil, cm (d) | >50 | --- | 20-50 | <20 |
| Flooding (i) | none | --- | occasional | frequent, very frequent |
| Stoniness[2] (p) | 0-1 | 2 | 3 | 4-5 |
| Rockiness[2] (r) | 0 | 1 | --- | 2-5 |
| Slope, % (t) | 2-9 | <2,9-15 | 15-30 | >30 |
| Drainage[2,3] (w) | W | MW,R | I | P,VP |
| Texture, average of friable soil (m) | L,SL,SiL<br>GL,GSL,GSiL | SCL,CL,SiCL<br>GSCL,GCL,GSiCL<br>VGSiL,VGL,VGSL | SiC,LS,S | GLS,VGLS<br>VGS |

Sources: Holmstrom 1986, Webb et al. 1989.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] Improve by one drainage class where tile drainage is feasible, for all soil conditions except the following: <2% slope; organic soils; <100 cm to bedrock; rockiness classes 2-5; stoniness classes 4-5; and where frequent flooding by rivers, lakes, and streams occurs.

Table 7. Soil suitability for spring cereals

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth of friable soil, cm (d) | >50 | 20-50 | --- | <20 |
| Flooding (i) | none | occasional | frequent | very frequent |
| Stoniness[2] (p) | 0-1 | 2 | 3 | 4-5 |
| Rockiness[2] (r) | 0 | 1 | --- | 2-5 |
| Slope, % (t) | <5 | 5-9 | 9-15 | >15 |
| Drainage[2,3] (w) | W,MW | R,I | P | VP |
| Texture, average of friable soil (m) | L,SL,SiL<br>GSL,GL,GSiL | (CL,SiCL<br>SCL,GSCL<br>GSiCL,GCL)[4]<br>LS,S | GLS,GS<br>VGL,VGSL | SiC,VGS<br>VGLS |

Sources: Holmstrom 1986, Webb et al. 1989.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] Improve by one drainage class where tile drainage is feasible, for all soil conditions except the following: <2% slope; organic soils; <100 cm to bedrock; rockiness classes 2-5; stoniness classes 4-5; and where frequent flooding by rivers, lakes, and streams occurs.

[4] Downgrade one class if drainage is imperfect.

Table 8. Soil suitability for winter wheat

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth of friable soil, cm (d) | >50 | --- | 20-50 | <20 |
| Flooding (i) | none | occasional | frequent | very frequent |
| Stoniness[2] (p) | 0-1 | 2 | 3 | 4-5 |
| Rockiness[2] (r) | 0 | 1 | --- | 2-5 |
| Slope, % (t) | 2-5 | <2,5-9 | 9-15 | >15 |
| Drainage[2,3] (w) | W,MW,R | I | P | VP |
| Texture, average of friable soil (m) | L,SiL,SL<br>GL,GSL<br>GSiL | LS,S | CL,SiCL,SCL<br>GSCL,GCL,GS<br>GSiCL,GLS<br>VGSL,VGL,VGSiL | VGS,VGLS<br>SiC |

Source: Holmstrom 1986, Webb et al. 1989.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] Improve by one drainage class where tile drainage is feasible, for all soil conditions except the following: <2% slope; organic soils; <100 cm to bedrock; rockiness classes 2-5; stoniness classes 4-5; and where frequent flooding by rivers, lakes, and streams occurs.

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Ac4/A | 3DW>4DW | Pm>Pmw | Pw>Uw | Pm | Pm |
| Ac4/B | 3DW>4DW | Pm>Pmw | Pw>Uw | Pm | Pm |
| Ac5/A | 4DW | Pmw | Uw | Pm | Pm |
| Ac6/A | 4DW>*NR | Pmw>Uiw | Uw>Uiw | Pm>Uiw | Pm>Uiw |
| Ct/A | NR | Uiw | Uiw | Uiw | Uiw |
| Cd1/C | 4PR | Pp | Pp | Ur | Ur |
| Cd1/D | 4PR | Ppt | Pp | Ur | Ur |
| Cd1/E | 5X | Ut | Pp | Ur | Ur |
| Cd1/F | 5T | Ut | Ppt | Urt | Urt |
| Cd1/G | 7T | Ut | Ut | Ut | Ut |
| Cd2/C | 4PR>4P | Pp | Pp | Ur>Pp | Ur>Pp |
| Cd2/D | 4PR>4P | Ppt | Pp | Ur>Pp | Ur>Pp |
| Cd2/E | 5X>4PT | Ut | Pp | Ur>Pp | Ur>Ppt |
| Cd2/F | 5T | Ut | Ppt | Urt>Ut | Urt>Ut |
| Cd2/G | 7T | Ut | Ut | Urt>Ut | Urt>Ut |
| Cd3/B | 4P | Pp | Ppw | Pp | Pp |
| Cd3/C | 4P | Pp | Pp | Pp | Pp |
| Cd3/D | 4P | Ppt | Pp | Pp | Pp |
| Cd3/E | 4PT | Ut | Pp | Ppt | Ppt |
| Cd3/F | 5T | Ut | Ppt | Ut | Ut |
| Cd4/B | 4P>5W | Pp>Ppw | Ppw>Uw | Pp | Pp |
| Cd4/C | 4P | Pp | Pp>Ppw | Pp | Pp |
| Cd4/D | 4P | Ppt | Pp>Ppw | Pp | Pp |
| Cd4/E | 4PT | Ut | Pp>Ppw | Ppt | Ppt |
| Cd5/C | 4P | Pp | Ppw | Pp | Pp |
| Cd5/D | 4P | Ppt | Ppw | Pp | Pp |
| Cd5/E | 4PT | Ut | Ppw | Ppt | Ppt |
| Cd6/C | 4P>NR | Pp>Uiw | Ppw>Uiw | Pp>Uiw | Pp>Uiw |
| Cd6/D | 4P>NR | Ppt>Uiw | Ppw>Uiw | Pp>Uiw | Pp>Uiw |
| Cb | 7X | Ui | Uim | Uim | Uim |
| Cm1/A | 3I | Fi | Pi | Fi | Fit |
| Cm1/B | 3I | Fi | Pi | Fi | Fit |
| Cm1/C | 3I | Fit | Pi | Fi | Fi |
| Cm2/B | 3I>4I | Fi>Pi | Pi>Ui | Fi>Pi | Fit>Pi |
| Cm3/B | 4I | Pi | Ui | Pi | Pit |
| Cm3/C | 4I | Pi | Ui | Pi | Pi |
| Cm3/D | 4I | Pit | Ui | Pi | Pit |
| Cm4/B | 4I>5I | Pi>Ui | Ui>Uiw | Pi>Ui | Pit>Ui |
| Cm4/C | 4I>5I | Pi>Ui | Ui>Uiw | Pi>Ui | Pi>Ui |
| Cm4/D | 4I>5I | Pit>Ui | Ui>Uiw | Pi>Ui | Pi>Ui |
| Cm5/A | 5I | Ui | Uiw | Ui | Ui |
| Cm5/B | 5I | Ui | Uiw | Ui | Ui |
| Cm5/C | 5I | Ui | Uiw | Ui | Ui |
| Cm6/A | 5I>NR | Ui>Uiw | Uiw | Ui>Uiw | Ui>Uiw |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Cm6/B | 5I>NR | Ui>Uiw | Uiw | Ui>Uiw | Ui>Uiw |
| Cm6/C | 5I>NR | Ui>Uiw | Uiw | Ui>Uiw | Ui>Uiw |
| Dg3/D | 3DT | Pt | Pd | Px | Pd |
| Dg3/E | 4T | Ut | Pd | Pt | Pdt |
| Dg3/F | 5T | Ut | Pdt | Ut | Ut |
| Dg4/C | 3D>4W | Px | Pd>Pdw | Fdp>Px | Pd |
| Dg4/D | 3DT>4W | Pt | Pd>Pdw | Px | Pd |
| Dg4/E | 4T>4TW | Ut | Pd>Pdw | Pt | Pdt |
| Dg4/F | 5T | Ut | Pdt>Ux | Ut | Ut |
| Dg5/B | 5W | Pw | Uw | Pw | Pdw |
| Dg5/C | 4W | Px | Pdw | Px | Pd |
| Dg5/D | 4W | Pt | Pdw | Px | Pd |
| Fs4/B | 4W>5W | Px>Pkw | Pdw>Uw | Pm>Pw | Pm>Ux |
| Fs4/C | 4W>5W | Px>Pk | Pd>Pdw | Fdm>Px | Pdm |
| Fs5/B | 5W | Pkw | Uw | Pw | Pdw |
| Fs5/C | 5W | Pk | Pdw | Px | Ux |
| Fs6/B | 5W>NR | Pkw>Uiw | Uw>Uiw | Pw>Uiw | Ux>Uiw |
| Fo1/A | 4P | Pp | Pp | Pp | Pp |
| Fo1/C | 4P | Pp | Pp | Pp | Pp |
| Fo1/G | 7T | Ut | Ut | Ut | Ut |
| Fo2/D | 4P | Ppt | Pp | Pp | Pp |
| Fo2/E | 4PT | Ut | Pp | Ppt | Pp |
| Fo2/F | 5T | Ut | Ppt | Ut | Ut |
| Fo2/G | 7T | Ut | Ut | Ut | Ut |
| Fo3/C | 4P | Pp | Pp | Pp | Pp |
| Fo3/D | 4P | Ppt | Pp | Pp | Pp |
| Fo3/E | 4PT | Ut | Pp | Ppt | Ppt |
| Fo4/C | 4P>4W | Pp>Px | Pp>Pdw | Pp>Px | Pp>Pd |
| Fo4/D | 4P>4W | Ppt>Pt | Pp>Pdw | Pp>Px | Pp>Pd |
| Fo5/C | 4W | Px | Pdw | Px | Pd |
| Fo5/D | 4W | Pt | Pdw | Px | Pd |
| Hd1/E | 4T | Ut | Fpt | Pt | Pt |
| Hd1/F | 5T | Ut | Pt | Ut | Ut |
| Hd2/D | 3T>3DT | Pt | Fp>Pd | Fpt>Px | Fpt>Pd |
| Hd2/E | 4T | Ut | Fpt>Pd | Pt | Pt>Pdt |
| Hd3/C | 3D | Px | Pd | Fdp | Pd |
| Hd3/D | 3DT | Pt | Pd | Px | Pd |
| Hd4/C | 3D>4W | Px | Pd>Pdw | Fdp>Px | Pd |
| Hd4/D | 3DT>4W | Pt | Pd>Pdw | Px | Pd |
| Hd5/C | 4W | Px | Pdw | Px | Pd |
| Hd5/D | 4W | Pt | Pdw | Px | Pd |
| He1/B | 3M | Fm | Ftw | Fw | Ft |
| He1/C | 3M | Fmt | Fw | Fw | G |
| He1/D | 3MT | Pt | Fw | Ftw | Ft |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| He1/E | 4T | Ut | Ftw | Pt | Pt |
| He1/F | 5T | Ut | Pt | Ut | Ut |
| He1/G | 7T | Ut | Ut | Ut | Ut |
| He2/B | 3M>3W | Fm>Fmw | Ftw>Pw | Fw | Ft>Ftw |
| He2/C | 3M>2C | Fmt | Fw | Fw>G | G |
| He2/D | 3MT>3T | Pt | Fw | Ftw>Ft | Ft |
| He2/E | 4T | Ut | Ftw | Pt | Pt |
| He2/F | 5T | Ut | Pt | Ut | Ut |
| He2/G | 7T | Ut | Ut | Ut | Ut |
| He3/B | 3W | Fmw | Pw | Fw | Ftw |
| He3/C | 2C | Fmt | Fw | G | G |
| He3/D | 3T | Pt | Fw | Ft | Ft |
| He3/E | 4T | Ut | Ftw | Pt | Pt |
| He4/B | 3W>5W | Fmw>Pw | Pw>Uw | Fw>Pw | Ftw>Pw |
| He4/C | 2C>3MW | Fmt>Px | Fw>Pw | G>Fw | G>Fw |
| He4/D | 3T>4X | Pt | Fw>Pw | Ft>Ftw | Ft>Ftw |
| He5/B | 5W | Pw | Uw | Pw | Pw |
| He5/C | 3MW | Px | Pw | Fw | Fw |
| He5/D | 4X | Pt | Pw | Ftw | Ftw |
| He6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pw>Uiw |
| He6/C | 3MW>NR | Px>Uiw | Pw>Uiw | Fw>Uiw | Fw>Uiw |
| He7/C | 3M>3MW | Fmt>Pw | Fw>Pw | Fw | G>Fw |
| He7/D | 3MT>4X | Pt | Fw>Pw | Ftw | Ft>Ftw |
| Kh1/D | 4P | Ppt | Pp | Pp | Pp |
| Kh1/F | 5T | Ut | Ppt | Ut | Ut |
| Kh2/D | 4P | Ppt | Pp | Pp | Pp |
| Kh2/E | 4PT | Ut | Pp | Ppt | Ppt |
| Kh2/F | 5T | Ut | Ppt | Ut | Ut |
| Kh3/D | 4P | Ppt | Pp | Pp | Pp |
| Kh3/E | 4PT | Ut | Pp | Ppt | Ppt |
| Kh4/E | 4PT | Ut | Pp>Ppw | Ppt | Ppt |
| Kh6/C | 4P>NR | Pp>Uiw | Pp>Uiw | Pp>Uiw | Pp>Uiw |
| Mi2/C | 2C | Px>Fpt | Fpw>Fp | Fp | Fp |
| Mi2/D | 3T | Pt | Fpw>Fp | Fpt | Fpt |
| Mi2/E | 4T | Ut | Px>Fpt | Pt | Pt |
| Mi3/C | 2C | Px | Fpw | Fp | Fp |
| Mi3/D | 3T | Pt | Fpw | Fpt | Fpt |
| Mi3/E | 4T | Ut | Px | Pt | Pt |
| Mi4/B | 3W>5W | Px | Pw>Uw | Fpw>Pw | Px>Pw |
| Mi4/C | 2C>3W | Px | Fpw>Pw | Fp>Fpw | Fp>Fpw |
| Mi4/D | 3T>3TW | Pt | Fpw>Pw | Fpt>Px | Fpt>Px |
| Mi4/E | 4T | Ut | Px>Pw | Pt | Pt |
| Mi4/F | 5T | Ut | Pt>Ptw | Ut | Ut |
| Mi5/B | 5W | Pw | Uw | Pw | Pw |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Mi5/C | 3W | Px | Pw | Fpw | Fpw |
| Mi5/D | 3TW | Pt | Pw | Px | Px |
| Mi6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pw>Uiw |
| Mi6/C | 3W>NR | Px>Uiw | Pw>Uiw | Fpw>Uiw | Fpw>Uiw |
| Pp2/C | 2C | Px | Fpr>Fpw | Fpr>Fp | Fpr>Fp |
| Pp2/D | 3T | Pt | Fpr>Fpw | Px>Fpt | Px>Fpt |
| Pp2/E | 4T | Ut | Px | Pt | Pt |
| Pp2/F | 5T | Ut | Pt | Ut | Ut |
| Pp2/H | 7T | Ut | Ut | Ut | Ut |
| Pp3/C | 2C | Px | Fpw | Fp | Fp |
| Pp3/D | 3T | Pt | Fpw | Fpt | Fpt |
| Pp3/E | 4T | Ut | Px | Pt | Pt |
| Pp4/C | 2C>3W | Px | Fpw>Pw | Fp>Fpw | Fp>Fpw |
| Pp4/D | 3T>3TW | Pt | Fpw>Pw | Fpt>Px | Fpt>Px |
| Pp5/C | 3W | Px | Pw | Fpw | Fpw |
| Ph1/C | 5P | Upr | Upr | Upr | Upr |
| Ph1/D | 5P | Upr | Upr | Upr | Upr |
| Ph2/C | 5P | Upr | Upr | Upr | Upr |
| Ph2/D | 5P | Upr | Upr | Upr | Upr |
| Ph2/E | 5P | Upr | Upr | Upr | Upr |
| Ph3/C | 5P | Upr | Upr | Upr | Upr |
| Ph3/D | 5P | Upr | Upr | Upr | Upr |
| Ph4/C | 5P | Upr | Upr | Upr | Upr |
| Ph4/D | 5P | Upr | Upr | Upr | Upr |
| Ph4/E | 5P | Upr | Upr | Upr | Upr |
| Ph5/B | 5P | Upr | Upr | Upr | Upr |
| Ph5/C | 5P | Upr | Upr | Upr | Upr |
| Ph5/D | 5P | Upr | Upr | Upr | Upr |
| Ph6/C | 5P>NR | Upr>Uiw | Upr>Uiw | Upr>Uiw | Upr>Uiw |
| Ph7/C | 5P | Upr | Upr | Upr | Upr |
| Pw1/A | 2C | G | Fw | G | Ft |
| Pw1/B | 2C | G | Fw | G | Ft |
| Pw1/C | 2C | Ft | G | G | G |
| Pw1/D | 3T | Pt | G | Ft | Ft |
| Pw1/E | 4T | Ut | Ft | Pt | Pt |
| Pw2/C | 2C>3D | Ft>Px | G>Pd | G>Fd | G>Pd |
| Pw2/D | 3T>3DT | Pt | G>Pd | Ft>Fdt | Ft>Pd |
| Pw3/B | 4W | Px | Pdw | Fdw | Pd |
| Pw3/C | 3D | Px | Pd | Fd | Pd |
| Pw3/D | 3DT | Pt | Pd | Fdt | Pd |
| Pw3/E | 4T | Ut | Pd | Pt | Pdt |
| Pw4/C | 3D<4W | Px | Pd>Pdw | Fd>Fdw | Pd |
| Pw4/D | 3DT>4W | Pt | Pd>Pdw | Fdt>Px | Pd |
| Pw5/B | 5W | Pw | Uw | Pw | Pdw |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Pw5/C | 4W | Px | Pdw | Fdw | Pd |
| Pw5/D | 4W | Pt | Pdw | Px | Pd |
| Pw6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pdw>Uiw |
| Pw6/C | 4W>NR | Px>Uiw | Pw>Uiw | Pdw>Uiw | Pd>Uiw |
| Qu2/D | 3DT | Pt | Pd | Fdt | Pd |
| Qu3/B | 4W | Px | Pdw | Fdw | Pdw |
| Qu3/C | 3D | Px | Pd | Fd | Pd |
| Qu3/D | 3DT | Pt | Pd | Fdt | Pd |
| Qu3/E | 4T | Ut | Pd | Pt | Pdt |
| Qu3/F | 5T | Ut | Pdt | Ut | Ut |
| Qu3/G | 7T | Ut | Ut | Ut | Ut |
| Qu4/B | 4W>5W | Px>Px | Pdw>Uw | Fdw>Pw | Pd>Ux |
| Qu4/C | 3D>4W | Px | Pd>Pdw | Fd>Px | Pd>Pdm |
| Qu4/D | 3DT>4W | Pt | Pd>Pdw | Fdt>Px | Pd>Pdm |
| Qu4/E | 4T | Ut | Pd>Pdw | Pt>Pmt | Pd>Ux |
| Qu5/B | 5W | Pw | Uw | Pw | Ux |
| Qu5/C | 4W | Px | Pdw | Px | Pdm |
| Qu5/D | 4W | Pt | Pdw | Px | Pdm |
| Qu5/E | 4WT | Ut | Pdw | Pt | Ux |
| Qu6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Ux>Uiw |
| Qu6/C | 4W>NR | Px>Uiw | Pdw>Uiw | Px>Uiw | Pdm>Uiw |
| Qu6/D | 4W>NR | Pt>Uiw | Pdw>Uiw | Px>Uiw | Pdm>Uiw |
| Qu6/E | 4WT>NR | Ut>Uiw | Pdw>Uiw | Pt>Uiw | Ux>Uiw |
| Ra2/C | 4P>4X | Pp>Px | Pp>Fpw | Pp>Fp | Pp>Fp |
| Ra2/D | 4P>4X | Ppt>Pt | Pp>Fpw | Pp>Fpt | Pp>Fpt |
| Ra2/E | 4PT>4T | Ut | Pp>Px | Ppt>Pt | Ppt>Pt |
| Ra2/F | 5T | Ut | Ppt>Pt | Ut | Ut |
| Ra3/C | 3DP | Px | Fpw | Fp | Fp |
| Ra3/D | 4X | Pt | Fpw | Fpt | Fpt |
| Ra3/E | 4T | Ut | Px | Pt | Pt |
| Ra4/C | 3DP>4W | Px | Fpw>Pdw | Fp>Px | Fp>Pd |
| Ra4/D | 4X>4W | Pt | Fpw>Pdw | Fpt>Px | Fpt>Pd |
| Ra5/B | 5W | Pw | Uw | Pw | Pdw |
| Ra5/C | 4W | Px | Pdw | Px | Pd |
| Ra6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pdw>Uiw |
| Ra6/C | 4W>NR | Px>Uiw | Pdw>Uiw | Px>Uiw | Pd>Uiw |
| Ra6/D | 4W>NR | Pt>Uiw | Pdw>Uiw | Px>Uiw | Pd>Uiw |
| Ry1/C | 4R | Ur | Ur | Ur | Ur |
| Ry1/D | 4R | Ur | Ur | Ur | Ur |
| Ry1/F | 5T | Urt | Ur | Urt | Ur |
| Ry1/G | 7T | Urt | Urt | Urt | Urt |
| Ry2/D | 4R | Ur | Ur | Ur | Ur |
| Ry4/C | 4X>4W | Pm | Px | Pm | Pm |
| SM | 7X | Uiw | Uiw | Uiw | Uiw |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Se3/B | 4I | Pi | Ui | Pi | Pi |
| Se3/C | 4I | Pi | Ui | Pi | Pi |
| Se4/A | 4I>5I | Pi>Ui | Ui>Uiw | Pi>Ui | Pi>Ui |
| Se4/B | 4I>5I | Pi>Ui | Ui>Uiw | Pi>Ui | Pi>Ui |
| Se4/C | 4I>5I | Pi>Ui | Ui>Uiw | Pi>Ui | Pi>Ui |
| Se5/A | 5I | Ui | Uiw | Ui | Ui |
| Se5/B | 5I | Ui | Uiw | Ui | Ui |
| Se6/A | 5I>NR | Ui>Uiw | Uiw>Uiw | Ui>Uiw | Ui>Uiw |
| Se6/B | 5I>NR | Ui>Uiw | Uiw>Uiw | Ui>Uiw | Ui>Uiw |
| Tm1/C | 4P | Pp | Pp | Pp | Pp |
| Tm1/D | 4P | Ppt | Pp | Pp | Pp |
| Tm1/E | 4PT | Ut | Pp | Ppt | Ppt |
| Tm2/C | 4P | Pp | Pp | Pp | Pp |
| Tm2/D | 4P | Ppt | Pp | Pp | Pp |
| Tm2/E | 4PT | Ut | Pp | Ppt | Ppt |
| Tm2/F | 5T | Ut | Ppt | Ut | Ut |
| Tm3/C | 4P | Pp | Pp | Pp | Pp |
| Tm3/D | 4P | Ppt | Pp | Pp | Pp |
| Tm3/E | 4PT | Ut | Pp | Ppt | Ppt |
| Tm3/F | 5T | Ut | Ppt | Ut | Ut |
| Tm4/B | 3W>5W | Px>Pw | Pw>Uw | Fpw>Pw | Fpw>Pw |
| Tm4/C | 2C>3W | Px | Fpw>Pw | Fp>Fpw | Fp>Fpw |
| Tm5/C | 3W | Px | Pw | Fpw | Fpw |
| Tm5/D | 3TW | Pt | Pw | Px | Px |
| Tm5/E | 4T | Ut | Pw | Pt | Pt |
| Tm6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pw>Uiw |
| Tm6/C | 3W>NR | Px>Uiw | Pw>Uiw | Fpw>Uiw | Fpw>Uiw |
| Tm6/D | 3TW>NR | Pt>Uiw | Pw>Uiw | Px>Uiw | Px>Uiw |
| Tu1/C | 2C | Ft | G | G | G |
| Tu1/D | 3T | Pt | G | Ft | Ft |
| Tu1/E | 4T | Ut | Ft | Pt | Pt |
| Tu2/C | 2C | Ft | G>Fw | G | G |
| Tu2/D | 3T | Pt | G>Fw | Ft | Ft |
| Tu2/G | 7T | Ut | Ut | Ut | Ut |
| Tu3/B | 3W | Fw | Pw | Fw | Fw |
| Tu3/C | 2C | Ft | Fw | G | G |
| Tu3/D | 3T | Pt | Fw | Ft | Ft |
| Tu3/E | 4T | Ut | Ftw | Pt | Pt |
| Tu4/C | 2C>3W | Ft>Ftw | Fw>Pw | G>Fw | G>Fw |
| Tu4/D | 3T>3TW | Pt | Fw>Pw | Ft>Ftw | Ft>Ftw |
| Tu5/C | 3W | Ftw | Pw | Fw | Fw |
| Tu5/D | 3TW | Pt | Pw | Ftw | Ftw |
| Tu5/E | 4T | Ut | Pw | Pt | Pt |
| Wb1/C | 3R | Px | Fpr | Fpr | Fpr |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (continued)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Wb1/D | 3RT | Pt | Fpr | Px | Px |
| Wb1/E | 4T | Ut | Px | Pt | Pt |
| Wb1/F | 5T | Ut | Pt | Ut | Ut |
| Wb2/C | 3R | Px | Fpr>Px | Fpr | Fpr |
| Wb2/D | 3RT | Pt | Fpr>Px | Px | Px |
| Wb2/E | 4T | Ut | Px | Pt | Pt |
| Wb2/F | 5T | Ut | Pt | Ut | Ut |
| Wb3/C | 2C | Px | Fp | Fp | Fp |
| Wb3/D | 3T | Pt | Fp | Ppt | Px |
| Wb4/E | 4T>4TW | Ut | Px>Pw | Pt | Pt |
| Wo1/C | 2C | Fmt | Fp | Fp | Fp |
| Wo2/C | 2C | Fmt>Px | Fp>Fpw | Fp | Fp |
| Wo2/D | 3T | Pt | Fp>Fpw | Fpt | Fpt |
| Wo2/E | 4T | Ut | Fpt>Px | Pt | Pt |
| Wo2/F | 5T | Ut | Pt | Ut | Ut |
| Wo3/C | 2C | Px | Fp | Fp | Fp |
| Wo3/D | 3T | Pt | Fp | Fpt | Fpt |
| Wo3/E | 4T | Ut | Fpt | Pt | Pt |
| Wo4/C | 2C>3W | Px | Fpw>Pw | Fp>Fpw | Fp>Fpw |
| Wo4/D | 3T>3TW | Pt | Fpw>Pw | Fpt>Px | Fpt>Px |
| Wo5/B | 5W | Pw | Uw | Pw | Pw |
| Wo5/C | 3W | Px | Pw | Fpw | Fpw |
| Wo5/D | 3TW | Pt | Pw | Px | Px |
| Wo6/B | 5W>NR | Pw>Uiw | Uw>Uiw | Pw>Uiw | Pw>Uiw |
| Wo6/C | 3W>NR | Px>Uiw | Pw>Uiw | Fpw>Uiw | Fpw>Uiw |
| Wd1/B | 2C | G | Ft | G | Ft |
| Wd1/C | 2C | Ft | G | G | G |
| Wd1/D | 3T | Pt | G | Ft | Ft |
| Wd1/E | 4T | Ut | Ft | Pt | Pt |
| Wd2/C | 2C | Ft>Fkt | G>Fw | G | G |
| Wd2/D | 3T | Pt | G>Fw | Ft | Ft |
| Wd2/E | 4T | Ut | Ft>Ftw | Pt | Pt |
| Wd3/B | 3W | Fkw | Pw | Fw | Ftw |
| Wd3/C | 2C | Fkt | Fw | G | G |
| Wd3/D | 3T | Pt | Fw | Ft | Ft |
| Wd3/E | 4T | Ut | Ftw | Pt | Pt |
| Wd4/C | 2C>4W | Fkt>Px | Fw>Pdw | G>Fdw | G>Pd |
| Wd4/D | 3T>4W | Pt | Fw>Pdw | Ft>Px | Ft>Pd |
| Wd4/E | 4T>4TW | Ut | Ftw>Pdw | Pt | Pt>Pdt |
| Wd5/B | 5W | Pw | Uw | Pw | Pdw |
| Wd5/C | 4W | Px | Pw | Fdw | Pd |
| Wd6/C | 4W>NR | Px>Uiw | Pdw>Uiw | Fdw>Uiw | Pd>Uiw |
| Wd6/E | 4TW>NR | Ut>Uiw | Pdw>Uiw | Pt>Uiw | Pdt>Uiw |
| Wn1/C | 5P | Upr | Upr | Upr | Upr |

(continued)

Table 9. SOIL INTERPRETATIONS FOR AGRICULTURE (concluded)

| Map symbol | Agriculture capability | Vegetable crops | Alfalfa | Spring cereals | Winter wheat |
|---|---|---|---|---|---|
| Wn1/D | 5P | Upr | Upr | Upr | Upr |
| Wn1/E | 5P | Upt | Upr | Upr | Upr |
| Wn1/F | 5PT | Upt | Upr | Upr | Upr |
| Wn1/G | 7T | Upt | Ut | Ut | Ut |
| Wn2/C | 5P | Upr | Upr>Up | Upr>Up | Upr>Up |
| Wn2/D | 5P | Upr | Upr>Up | Upr>Up | Upr>Up |
| Wn2/E | 5P | Upt | Upr>Up | Upr>Up | Upr>Up |
| Wn2/F | 5PT | Upt | Upr>Up | Upr>Upt | Upr>Upt |
| Wn2/G | 7T | Upt | Upr>Upt | Upr>Upt | Upr>Upt |
| Wn3/C | 5P | Upr | Upr | Upr | Upr |
| Wn3/D | 5P | Upr | Upr | Upr | Upr |
| Wn3/E | 5P | Upr | Upr | Upr | Upr |
| Wn3/F | 5PT | Upr | Upr | Upt | Upt |
| Wn4/B | 5P | Up | Up>Upw | Up | Up |
| Wn4/C | 5P | Up | Up>Upw | Up | Up |
| Wn4/D | 5P | Up | Up>Upw | Up | Up |
| Wn5/C | 5P | Up | Upw | Up | Up |
| Wn5/D | 5P | Up | Upw | Up | Up |
| Wn5/E | 5P | Upt | Upw | Up | Up |
| Wn6/C | 5P>NR | Up>Uiw | Upw>Uiw | Up>Uiw | Up>Uiw |
| Wn6/D | 5P>NR | Up>Uiw | Upw>Uiw | Up>Uiw | Up>Uiw |

*NR - not rated

## On-site sewage disposal systems

On-site sewage disposal systems distribute effluent from septic tanks, through a subsurface system of perforated pipe, into the soil where it is absorbed. The subsurface pipe is laid in a trench that closely parallels the natural contour of the land. The soil and site characteristics considered for this interpretation are those that affect the absorption of effluent, the potential for contamination of water supplies, and the construction and maintenance of the system.

Properties that affect the absorption ability of soils are the permeability of the soil, soil drainage as it relates to the persistence of seasonally high water tables, depth of bedrock, and susceptibility to flooding. Surface stones and steep slopes interfere with installation. Steep slopes may also cause lateral seepage of the effluent that may surface downslope. Erosion on steep slopes can be damaging to absorption fields, which may require costly maintenance. Some soils are underlain by loose sand and gravel (e.g., Hebert soils), that may not adequately filter the effluent and as a result groundwater may become contaminated.

Table 10 presents the criteria and classes used to make this interpretation.

## Housing

The soil suitability ratings for housing are for homes (single-family dwellings) and other structures (buildings of three stories or fewer) with similar foundation requirements. The soils are rated for buildings with and without basements. Basements are considered to be at least 1.5 m deep. Standard construction practices are assumed, such as dampproofing and installation of foundation drains. The emphasis in rating soils for housing is placed on the properties that affect suitability for foundations. Properties influencing the ease or difficulty of excavation and construction are evaluated for both the building and the installation of utility lines. Excluded from soil suitability ratings for housing are soil suitability for septic tanks and access roads, water supply potential, and factors of location desirability. These are general ratings. It is important to note that on-site investigations are necessary for specific placement of buildings and utility lines and for detailed design of foundations. The ratings are based on soil properties that affect soil strength, settlement under a load, and the ease of excavation.

The properties affecting soil strength and settlement are soil wetness (as inferred by soil drainage), flooding, shrink-swell potential, and soil compressibility. All soils in Colchester County have low to very low shrink-swell potential. Soil compressibility is inferred from the Unified Soil Classification System (see Appendix 4). Properties influencing the ease of excavation are flooding, soil wetness, slope, depth to bedrock, and surface stoniness.

Table 11 presents the criteria and classes used to make this interpretation.

### Area-type sanitary landfill

A sanitary landfill is a waste disposal area and should be operated in such a way as to minimize its offensiveness (i.e., smoke, odor, appearance, and pollution hazard). Soil is used as the covering and sanitizing material. In the area-type sanitary landfill, successive deposits of refuse are covered by layers of soil until successive layers of waste and soil are built up to the ultimate thickness. Then a final cover of soil is placed over the fill. The soil used for covering is either material left over from preparing (stripping) the landfill area or it can be hauled in.

Soil properties that influence trafficability and the risk of pollution are the main considerations for assessing sanitary landfills. Flooding is a serious problem because of the risk of washouts and stream pollution and the difficulty of moving trucks in and out of flooded areas. If soil permeability is too rapid, or if fractured bedrock is close to the surface, the risk of the leachate from the landfill contaminating the water supply is great. Wet soils with high water tables may also transmit pollutants to the water supply and may hamper the movement of trucks during wet seasons.

Slope is a consideration because of the extra grading required to maintain roads on sloping soils. Furthermore, leachate may flow along the soil surface on sloped soils and cause difficult seepage problems in completed fills.

Table 12 presents the criteria and classes used to make this interpretation.

### Local roads and streets

Suitability for local roads and streets refers to the use of the soil for construction and maintenance of local roads and streets that have all-weather surfacing, usually asphalt, and that are subject to automobile traffic all year. The roads and streets consist of a subgrade, usually of underlying local soil material; a subbase of stable material such as gravel or crushed rock; and the actual road surface or pavement usually asphalt, or in some rural areas, gravel with a binder.

Standard construction practices are assumed for drainage and road grading for shedding water. Most of the soil material used in road construction comes from the soil at hand. This guide is less applicable to the requirements for major highways.

The soil properties considered in this interpretation are those that affect the ease of construction and maintenance of the roads and their strength or load-carrying capacity. The properties that affect traffic-supporting capacity are soil strength as inferred from the AASHO and Unified classifications, shrink-swell behavior, potential frost action, and soil wetness.

Table 13 presents the criteria and classes used to make this interpretation.

## Sewage lagoons

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Each lagoon has a nearly level floor surrounded by cut slopes or embankments of compacted, relatively impervious soil material. Aerobic lagoons generally are designed so that the depth of sewage is 60-150 cm. Relatively impervious soil for the lagoon floor and sides is desirable to minimize seepage and contamination of local ground water (Soil Conservation Service 1982).

The soil properties and site features considered for this interpretation are those that affect the sewage lagoon's construction, function, and its ability to hold and retain liquid sewage.

Soil permeability is a critical soil property for sewage lagoons. If the soil is too porous it is difficult to maintain a constant water depth required for proper operation, and seepage from the lagoon may contaminate ground water. Flooding that overtops the lagoon will interfere with its proper function and may release untreated sewage to the river system.

Soils that contain large amounts of organic matter are unsuited for sewage lagoon sites. Organic matter promotes an anaerobic rather than aerobic environment, which interferes with the proper functioning of the lagoon.

Water table depth, as inferred by soil drainage, is important if it raises the water level in the lagoon to a point at which it would overflow and cause a pollution hazard. In impermeable soils high water tables pose no problem.

The construction of sewage lagoons is adversely affected by steep slopes, shallow soils, and high volumes of coarse fragments. Table 14 presents the criteria and classes used to make the interpretation.

Table 15 presents, for each map unit, the complete soil interpretations for community development.

Table 10. Soil suitability for on-site sewage disposal systems

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Permeability of subsoil,[2] cm/h (k) | 2-12 | 0.5-2 | <0.5 or 12-25 | >25 |
| Depth to compact subsoil, cm (d) | >50 | <50[3] | --- | --- |
| Flooding (i) | none | occasional | frequent | very frequent |
| Stoniness[4] (p) | 0-2 | 3 | 4-5 | --- |
| Depth to bedrock, cm (r) | >150 | 100-150 | 50-100 | <50 |
| Slope, % (t) | 2-9 | <2[5],9-15 | 15-30 | >30 |
| Drainage (w) | W,MW | R,I | P | VP |

Sources: Patterson, unpublished report, Wang and Rees 1983, United States Department of Agriculture 1976, Coen and Holland 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] Refers to permeability (as determined by the constant head method using core samples) of the subsoil at and below the depth of the tile line.

[3] Poor for slopes <2% or >15%.

[4] Day 1983.

[5] Good for well-drained soils with >50 cm of friable soil.

Table 11. Soil suitability for housing

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth to seasonal high water table, cm (w) | | | | |
| - with basement | >120 | 50-120 | <50 | permanently wet soils |
| [drainage] | [W,R] | [MW] | [I,P] | |
| - without basement | >50 | 20-50 | <20 | |
| [drainage] | [R,W,MW] | [I] | [P] | [VP] |
| Slope, % (t) | <9 | 9-15 | 15-30 | >30 |
| Depth to bedrock, cm (r) | | | | |
| - with basement | >150 | 100-150 | <150 | --- |
| - without basement | >100 | 50-100 | <50 | --- |
| Flood hazard (i) | none | none | occasional | frequent |
| Unified soil group[2] (b) | GW,GP,SW<br>SP,GM,GC<br>SM,SC,<br>CL (PI<15)[3] | CL (PI>15)[3]<br>ML | CH,MH<br>OL,OH | Pt |
| Potential frost action[4] (h) | low | moderate | high | --- |
| - drainage W,I | GW,GP,SW,SP | GM,GC,SM, CL,SP | ML,MH | |
| - drainage P | GW,GP | SW,SP,GC, CL | GM,SM,SC, ML,MH | |
| Stoniness[5,6] (p) | 0-2 | 3 | 4-5 | --- |
| Shrink-swell[7] | All soils in the survey area are ranked good | | | |

Sources: Wang and Rees 1983, United States Department of Agriculture 1976, Coen and Holland 1976.

Notes to Table 11.

[1] Soil factor class codes are defined in Appendix 3.

[2] Estimate of soil's ability to withstand applied loads.

[3] Plasticity index.

[4] United States Department of Agriculture 1976. Proper house construction should include preventive measures to reduce or eliminate frost heaving.

[5] In this area the surface stones are relatively small in size (<50 cm diameter) and thus are easily removed with light equipment when preparing the site. Thus stoniness is a less severe limitation than might be expected.

[6] Day 1983.

[7] Coen and Holland 1976.

Table 12. Soil suitability for area-type sanitary landfill

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Permeability of soil,[2] cm/h (k) | <5 | --- | 5-25 | >25 |
| Flooding (i) | none | <1 in 50 yr | 1 in 11-50 yr | >1 in 10 yr |
| Stoniness[3] (p) | 0-2 | 3 | 4-5 | --- |
| Depth to bedrock, cm (r) | >200 | 100-200 | 50-100 | <50 |
| Slope, % (t) | <9 | 9-15 | 15-30 | >30 |
| Depth to seasonal high water table,[4] cm (w) | >150 | 100-150 | 50-100 | <50 |
| [drainage] | [R,W] | [MW] | [I,P] | [VP] |
| Subsoil texture[5] (s) | SL,L,SiL<br>SCL | SiCL,CL<br>SC,LS | SiC,GS | organic |

Sources: Wang and Rees 1983, United States Department of Agriculture 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] Reflects the soil's ability to retard the movement of leachate from landfills, based on constant head hydraulic conductivity tests run on core samples.

[3] Day 1983.

[4] Refers to the true water table, and associated drainage classes are grouped accordingly. Soils that are poorly or imperfectly drained as a result of a perched water table (i.e., very slowly permeable subsoil, permeability less than 0.1 cm/h) can be rated one class higher.

[5] The subsoil texture reflects the ease of excavation and trafficability.

Table 13. Soil suitability for local roads and streets

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Depth to seasonal high water table, cm (w) | >100 | 100-20 | <20 | --- |
| [drainage] | [W,R] | [MW,I] | [P,VP] | |
| Slope,[2] % (t) | <5 | 5-15 | 15-30 | >30 |
| Depth to bedrock, cm (r) | >100 | 50-100 | <50 | --- |
| Stoniness[3] (p) | 0-2 | 3 | 4-5 | --- |
| Flood hazard (i) | none | <1 in 5 yr | 1 in 5 yr | yearly |
| Subgrade[4] (b) | | | | |
| - AASHO[5] | A1-A3 | A4-A5 | A6-A7 | --- |
| - Unified[6] | GW,GP,SW SP,(GM,GC SM,SC)[8] | CL (PI<15)[7] | ML,CH,MH<br>OL,OH<br>CL (PI>15) | Pt |
| Shrink-swell[9] | All soils in the survey area are ranked good | | | |
| Potential frost action[10] (h) | low | moderate | high | |
| - drainage W,I | GW,GP,SW,SP | GM,GC,SM, CL,SP | ML,MH | |
| - drainage P | GW,GP | SW,SP,GC, CL | GM,SM,SC, ML,MH | |

Sources: Wang and Rees 1983, United States Department of Agriculture 1976, Coen and Holland 1976.

Notes to Table 13 on page 100.

Notes to Table 13.

[1] Soil factor class codes are defined in Appendix 3.

[2] Due to winter conditions, limitation classes for slope have been altered from standards as set in references.

[3] Day 1983.

[4] Rates the general load-carrying capacity and service characteristics of soil as applied to subgrades or roadbeds.

[5] Asphalt Institute 1961.

[6] Unified soil group ratings according to Designation D2487-69.

[7] Plasticity index.

[8] Downgrade limitation to moderate if more than 30% passes No. 200 sieve.

[9] Coen and Holland 1976.

[10] United States Department of Agriculture 1976.

Table 14. Soil suitability for sewage lagoons

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Flooding[2] (i) | none | --- | 1 in 50 yr | yearly |
| Permeability in subsoil, cm/h (k) | <0.5 | 0.5-5 | 5-15 | >15 |
| Stoniness[3] (p) | 0-2 | 3 | 4 | 5 |
| Depth to bedrock, cm (r) | >150 | 100-150 | 50-100 | <50 |
| Slope, % (t) | <2 | 2-5 | 5-9 | >9 |
| Organic matter, % (o) | <2 | 2-10 | 10-30 | >30 |
| Coarse fragments,[3] % volume (f) | <20 | 20-35 | 35-50 | >50 |
| Unified class (b) | GC,SC,CL,CH | GM,ML,SM,MH | GP,GW,SW,SP | OL,OH,Pt |
| Depth to seasonal high water table,[4] cm (w) | >150 | 100-150 | 50-100 | <50 |
| [drainage] | [R] | [W,MW] | [I,P] | [VP] |

Sources: Mills and Smith 1981, United States Department of Agriculture 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] Disregard flooding if it is unlikely to enter or damage the lagoon (flood waters have low velocity and depth of <150 cm).

[3] Day 1983.

[4] If lagoon floor has nearly impermeable material (<0.5 cm/h) and is >50 cm thick, disregard water table.

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT

| Map symbol | On-site sewage disposal | Housing With basements | Housing Without basements | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| Ac4/A | Pk>Pkw | Phw | Ph>Phw | Pw | Pbh>Ux | Fb |
| Ac4/B | Pk>Pkw | Phw | Ph>Phw | Pw | Pbh>Ux | Fb |
| Ac5/A | Pkw | Phw | Phw | Pw | Ux | Fb |
| Ac6/A | Pkw>Uiw | Phw>Ubw | Phw>Uiw | Pw>Usww | Ux>Ubi | Fb>Ubw |
| Ct/A | Uiw | Ubi | Ubi | Usw | Ubi | Uow |
| Cd1/C | Pr | Pr | Fhp | Pr | Px | Pfr |
| Cd1/D | Pr | Pr | Fhp | Pr | Px | Ux |
| Cd1/E | Pr | Pr | Px | Pr | Px | Ut |
| Cd1/F | Prt | Prt | Pt | Prt | Pt | Ut |
| Cd1/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Cd2/C | Pr>Px | Pr>Pw | Fhp>Px | Pr>Pw | Px | Pfr>Pfw |
| Cd2/D | Pr>Px | Pr>Pw | Fhp>Px | Pr>Pw | Px | Ux |
| Cd2/E | Pr>Px | Pr>Pw | Px | Pr>Pw | Px | Ut |
| Cd2/F | Prt>Ptw | Prt>Ptw | Pt | Prt>Ptw | Pt | Ut |
| Cd2/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Cd3/B | Px | Pw | Px | Pw | Px | Pfw |
| Cd3/C | Px | Pw | Px | Pw | Px | Pfw |
| Cd3/D | Px | Pw | Px | Pw | Px | Ux |
| Cd3/E | Px | Pw | Px | Pw | Px | Ut |
| Cd3/F | Pt | Ptw | Pt | Ptw | Pt | Ut |
| Cd4/B | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Pfw |
| Cd4/C | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Pfw |
| Cd4/D | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Ux |
| Cd4/E | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Ut |
| Cd5/C | Pw | Phw | Phw | Pw | Phw | Pfw |
| Cd5/D | Pw | Phw | Phw | Pw | Phw | Ux |
| Cd5/E | Pw | Phw | Phw | Pw | Phw | Ut |
| Cd6/C | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Ux>Ubw |
| Cd6/D | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Ux>Ubw |
| Cb | Ui | Ui | Ui | Ui | Ui | Uiw |
| Cm1/A | Px | Pi | Pi | Ui | Ui | Ufi |
| Cm1/B | Px | Pi | Pi | Ui | Ui | Ufi |
| Cm1/C | Px | Pi | Pi | Ui | Ui | Ufi |
| Cm2/B | Px | Pi>Ui | Pi>Ui | Ui | Ui | Ufi |
| Cm3/B | Pi | Ui | Ui | Ui | Ui | Ufi |
| Cm3/C | Pi | Ui | Ui | Ui | Ui | Ufi |
| Cm3/D | Pi | Ui | Ui | Ui | Ui | Ufi |
| Cm4/B | Pi>Ui | Ui | Ui | Ui | Ui | Ufi |
| Cm4/C | Pi>Ui | Ui | Ui | Ui | Ui | Ufi |
| Cm4/D | Pi>Ui | Ui | Ui | Ui | Ui | Ufi |
| Cm5/A | Ui | Ui | Ui | Ui | Ui | Ufi |
| Cm5/B | Ui | Ui | Ui | Ui | Ui | Ufi |
| Cm5/C | Ui | Ui | Ui | Ui | Ui | Ufi |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Cm6/A | Ui>Uiw | Ui>Ubw | Ui>Ubw | Ui>Usw | Ui>Ubi | Ui>Ubw |
| Cm6/B | Ui>Uiw | Ui>Ubw | Ui>Ubw | Ui>Usw | Ui>Ubi | Ui>Ubw |
| Cm6/C | Ui>Uiw | Ui>Ubw | Ui>Ubw | Ui>Usw | Ui>Ubi | Ui>Ubw |
| Dg3/D | Pk | Phw | Ph | Pw | Pbh | Pt |
| Dg3/E | Pk | Phw | Ph | Pw | Pbh | Ut |
| Dg3/F | Ux | Ux | Pht | Ptw | Ux | Ut |
| Dg4/C | Pk>Pkw | Phw | Ph>Phw | Pw | Pbh>Ux | Px |
| Dg4/D | Pk>Pkw | Phw | Ph>Phw | Pw | Pbh>Ux | Pt |
| Dg4/E | Pk>Ux | Phw | Ph>Phw | Pw | Pbh>Ux | Ut |
| Dg4/F | Ux | Ux | Pht>Ux | Pwt | Ux | Ut |
| Dg5/B | Ux | Phw | Phw | Pw | Ux | Fbf |
| Dg5/C | Pkw | Phw | Phw | Pw | Ux | Px |
| Dg5/D | Pkw | Phw | Phw | Pw | Ux | Pt |
| Fs4/B | Pk>Ux | Phw | Ph>Phw | Pw>Fsw | Pbh>Ux | Fb |
| Fs4/C | Pk>Pkw | Phw | Ph>Phw | Pw>Fsw | Pbh>Ux | Fbt |
| Fs5/B | Ux | Phw | Phw | Fsw | Ux | Fb |
| Fs5/C | Pkw | Phw | Phw | Fsw | Ux | Fbt |
| Fs6/B | Ux>Uiw | Phw>Ubw | Phw>Ubw | Fsw>Usw | Ux>Ubi | Fb>Ubw |
| Fo1/A | Fpr | Px | Fhp | Px | Px | Px |
| Fo1/C | Fpr | Px | Fhp | Px | Px | Px |
| Fo1/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Fo2/D | Fpr>Px | Px>Pw | Fhp>Px | Px>Pw | Px | Pt>Ptw |
| Fo2/E | Px | Px>Pw | Px | Px>Pw | Px | Ut |
| Fo2/F | Pt | Pt>Ptw | Pt | Pt>Ptw | Pt | Ut |
| Fo2/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Fo3/C | Px | Pw | Px | Pw | Px | Pw |
| Fo3/D | Px | Pw | Px | Pw | Px | Ptw |
| Fo3/E | Px | Pw | Px | Pw | Px | Ut |
| Fo4/C | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Pw |
| Fo4/D | Px>Pw | Pw>Phw | Px>Phw | Pw | Px>Phw | Ptw |
| Fo5/C | Pw | Phw | Phw | Pw | Phw | Pw |
| Fo5/D | Pw | Phw | Phw | Pw | Phw | Ptw |
| Hd1/E | Ft | Fht | Fht | Ft | Px | Ut |
| Hd1/F | Pt | Pt | Pt | Pt | Pt | Ut |
| Hd2/D | G>Px | Fh>Pw | Fh>Fhw | G>Pw | Px | Pt>Ptw |
| Hd2/E | Ft>Px | Fht>Pw | Fht>Px | Ft>Pw | Px | Ut |
| Hd3/C | Px | Pw | Fhw | Pw | Px | Pw |
| Hd3/D | Px | Pw | Fhw | Pw | Px | Ptw |
| Hd4/C | Px>Pw | Pw>Phw | Fhw>Phw | Pw | Px>Phw | Pw |
| Hd4/D | Px>Pw | Pw>Phw | Fhw>Phw | Pw | Px>Phw | Ptw |
| Hd5/C | Pw | Phw | Phw | Pw | Phw | Pw |
| Hd5/D | Pw | Phw | Phw | Pw | Phw | Ptw |
| He1/B | Pk | G | G | Pks | G | Uf |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| He1/C | Pk | G | G | Pks | G | Uf |
| He1/D | Pk | G | G | Pks | Ft | Uf |
| He1/E | Pk | Ft | Ft | Pks | Ft | Uf |
| He1/F | Pkt | Pt | Pt | Ux | Pt | Uft |
| He1/G | Ut | Ut | Ut | Ut | Ut | Uft |
| He2/B | Pk>Ftw | G>Pw | G>Fw | Pks>Ux | G>Fw | Uf |
| He2/C | Pk>Fw | G>Pw | G>Fw | Pks>Ux | G>Fw | Uf |
| He2/D | Pk>Fw | G>Pw | G>Fw | Pks>Ux | Ft>Ftw | Uf |
| He2/E | Pk>Ftw | Ft>Pw | Ft>Ftw | Pks>Ux | Ft>Ftw | Uft |
| He2/F | Pkt | Pt>Ptw | Pt | Ux | Pt | Uft |
| He2/G | Ut | Ut | Ut | Ut | Ut | Uft |
| He3/B | Ftw | Pw | Fw | Ux | Fw | Uf |
| He3/C | Fw | Pw | Fw | Ux | Fw | Uf |
| He3/D | Fw | Pw | Fw | Ux | Ftw | Uft |
| He3/E | Ftw | Pw | Ftw | Ux | Ftw | Uft |
| He4/B | Ftw>Pw | Pw | Fw>Pw | Ux | Fw>Pw | Uf |
| He4/C | Fw>Pw | Pw | Fw>Pw | Ux | Fw>Pw | Uf |
| He4/D | Fw>Pw | Pw | Fw>Pw | Ux | Ftw>Pw | Uf |
| He5/B | Pw | Pw | Pw | Ux | Pw | Uf |
| He5/C | Pw | Pw | Pw | Ux | Pw | Uf |
| He5/D | Pw | Pw | Pw | Ux | Pw | Uf |
| He6/B | Pw>Uiw | Pw>Ubw | Pw>Ubw | Ux>Usw | Pw>Ubi | Uf>Ubw |
| He6/C | Pw>Uiw | Pw>Ubw | Pw>Ubw | Ux>Usw | Pw>Ubi | Uf>Ubw |
| He7/C | Pk>Pw | G>Pw | G>Pw | Pks>Ux | G>Pw | Uf |
| He7/D | Pk>Pw | G>Pw | G>Pw | Pks>Ux | Ft>Pw | Uf |
| Kh1/D | Fpr | Px | Fhp | Fpr | Px | Pft |
| Kh1/F | Pt | Pt | Pt | Pt | Pt | Ut |
| Kh2/D | Fpr>Px | Px>Pw | Fhp>Px | Fpr>Pw | Px | Pft>Ux |
| Kh2/E | Px | Px>Pw | Px | Px>Pw | Px | Ut |
| Kh2/F | Pt | Pt>Ptw | Pt | Pt>Ptw | Pt | Ut |
| Kh3/D | Px | Pw | Px | Pw | Px | Ux |
| Kh3/E | Px | Pw | Px | Pw | Px | Ut |
| Kh4/E | Px>Pw | Pw | Px>Pw | Pw | Px>Pw | Ut |
| Kh6/C | Pw>Uiw | Pw>Ubw | Pw>Ubw | Pw>Usw | Pw>Ubi | Ffw>Ubw |
| Mi2/C | Pk>Fk | Pw>Fhw | Fhw>Fh | Pw>Fsw | Px | Fft>Px |
| Mi2/D | Pk>Fk | Pw>Fhw | Fhw>Fh | Pw>Fsw | Px | Pt |
| Mi2/E | Pk>Fkt | Ptw>Px | Px>Fht | Pw>Px | Px | Ut |
| Mi3/C | Pk | Pw | Fhw | Pw | Px | Fft |
| Mi3/D | Pk | Pw | Fhw | Pw | Px | Pt |
| Mi3/E | Pk | Pw | Px | Pw | Px | Ut |
| Mi4/B | Pk>Pkw | Pw | Fhw>Pw | Pw | Px>Pw | Ff |
| Mi4/C | Pk>Pkw | Pw | Fhw>Pw | Pw | Px>Pw | Fft |
| Mi4/D | Pk>Pkw | Pw | Fhw>Pw | Pw | Px>Pw | Pt |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Mi4/E | Pk>Pkw | Pw | Px>Pw | Pw | Px>Pw | Ut |
| Mi4/F | Pkt>Ux | Ptw | Pt>Ptw | Ptw | Pt | Ut |
| Mi5/B | Pkw | Pw | Pw | Pw | Pw | Ff |
| Mi5/C | Pkw | Pw | Pw | Pw | Pw | Fft |
| Mi5/D | Pkw | Pw | Pw | Pw | Pw | Pt |
| Mi6/B | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Pw>Usw | Pw>Ubi | Ff>Ubw |
| Mi6/C | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Pw>Usw | Pw>Ubi | Fft>Ubw |
| Pp2/C | Fr>Fw | Fr>Pw | G>Fw | Pk>Pw | G>Fw | Pbk>Pbw |
| Pp2/D | Fr>Fw | Fr>Pw | G>Fw | Pk>Pw | Ft>Ftw | Ux |
| Pp2/E | Frt>Ftw | Frt>Pw | Ft>Ftw | Pk>Pw | Ft>Ftw | Ut |
| Pp2/F | Pt | Pt>Ptw | Pt | Pkt>Ptw | Ut | Ut |
| Pp2/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Pp3/C | Fw | Pw | Fw | Pw | Fw | Pbw |
| Pp3/D | Fw | Pw | Fw | Pw | Ftw | Ux |
| Pp3/E | Ftw | Pw | Ftw | Pw | Ftw | Ut |
| Pp4/C | Fw>Pw | Pw | Fw>Pw | Pw | Fw>Pw | Pbw |
| Pp4/D | Fw>Pw | Pw | Fw>Pw | Pw | Ftw>Pw | Ux |
| Pp5/C | Pw | Pw | Pw | Pw | Pw | Pbw |
| Ph1/C | Ppr | Ppr | Pp | Ppr | Pp | Ux |
| Ph1/D | Ppr | Ppr | Pp | Ppr | Pp | Ux |
| Ph2/C | Ppr | Ppr>Ux | Pp | Ppr>Ux | Pp | Ux |
| Ph2/D | Ppr | Ppr>Ux | Pp | Ppr>Ux | Pp | Ux |
| Ph2/E | Ppr | Ppr>Ux | Pp | Ppr>Ux | Pp | Ut |
| Ph3/C | Ppr | Ux | Pp | Ux | Pp | Ux |
| Ph3/D | Ppr | Ux | Pp | Ux | Pp | Ux |
| Ph4/C | Ppr>Ux | Ux | Pp>Php | Ux | Pp>Ux | Ux |
| Ph4/D | Ppr>Ux | Ux | Pp>Php | Ux | Pp>Ux | Ux |
| Ph4/E | Ppr>Ux | Ux | Pp>Php | Ux | Pp>Ux | Ut |
| Ph5/B | Ux | Ux | Php | Ux | Ux | Ux |
| Ph5/C | Ux | Ux | Php | Ux | Ux | Ux |
| Ph5/D | Ux | Ux | Php | Ux | Ux | Ux |
| Ph6/C | Ux>Uiw | Ux>Ubw | Php>Ubw | Ux>Usw | Ux>Ubi | Ux>Ubw |
| Ph7/C | Ppr>Ux | Ppr>Ux | Pp>Php | Ppr>Ux | Pp>Ux | Ux |
| Pw1/A | Fkt | Fhw | Fh | Fw | Px | Px |
| Pw1/B | Fkt | Fhw | Fh | Fw | Px | Px |
| Pw1/C | Fk | Fhw | Fh | Fw | Px | Px |
| Pw1/D | Fk | Fhw | Fh | Fw | Px | Pt |
| Pw1/E | Fkt | Px | Fht | Ftw | Px | Ut |
| Pw2/C | Fk>Pk | Fhw>Pw | Fh>Fhw | Fw | Px | Px>Fbt |
| Pw2/D | Fk>Pk | Fhw>Pw | Fh>Fhw | Fw | Px | Pt |
| Pw3/B | Pk | Pw | Fhw | Fw | Px | Fb |
| Pw3/C | Pk | Pw | Fhw | Fw | Px | Fbt |
| Pw3/D | Pk | Pw | Fhw | Fw | Px | Pt |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Pw3/E | Pk | Pw | Px | Ftw | Px | Ut |
| Pw4/C | Pk>Pkw | Pw>Phw | Fhw>Phw | Fw | Px>Phw | Fbt |
| Pw4/D | Pk>Pkw | Pw>Phw | Fhw>Phw | Fw | Px>Phw | Pt |
| Pw5/B | Ux | Phw | Phw | Fw | Phw | Fb |
| Pw5/C | Pkw | Phw | Phw | Fw | Phw | Fbt |
| Pw5/D | Pkw | Phw | Phw | Fw | Phw | Pt |
| Pw6/B | Ux>Uiw | Phw>Ubw | Phw>Ubw | Fw>Usw | Phw>Ubi | Fb>Ubw |
| Pw6/C | Pkw>Uiw | Phw>Ubw | Phw>Ubw | Fw>Usw | Phw>Ubi | Fbt>Ubw |
| Qu2/D | Pk | Pw>Fhw | Fhw>Fh | Fsw | Px | Pt |
| Qu3/B | Pdk | Pw | Fhw | Fsw | Px | G |
| Qu3/C | Pk | Pw | Fhw | Fsw | Px | Ft |
| Qu3/D | Pk | Pw | Fhw | Fsw | Px | Pt |
| Qu3/E | Pk | Pw | Px | Px | Px | Ut |
| Qu3/F | Ux | Ptw | Pt | Pt | Pt | Ut |
| Qu3/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Qu4/B | Pdk>Ux | Pw | Fhw>Pw | Fsw | Px>Pw | G |
| Qu4/C | Pk>Pkw | Pw | Fhw>Pw | Fsw | Px>Pw | Ft |
| Qu4/D | Pk>Pkw | Pw | Fhw>Pw | Fsw | Px>Pw | Pt |
| Qu4/E | Pk>Pkw | Pw | Px>Pw | Px | Px>Pw | Ut |
| Qu5/B | Ux | Pw | Pw | Fsw | Pw | G |
| Qu5/C | Pkw | Pw | Pw | Fsw | Pw | Ft |
| Qu5/D | Pkw | Pw | Pw | Fsw | Pw | Pt |
| Qu5/E | Pkw | Pw | Pw | Px | Pw | Ut |
| Qu6/B | Ux>Uiw | Pw>Ubw | Pw>Ubw | Fsw>Usw | Pw>Ubi | G>Ubw |
| Qu6/C | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Fsw>Usw | Pw>Ubi | Ft>Ubw |
| Qu6/D | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Psw>Usw | Pw>Ubi | Pt>Ubw |
| Qu6/E | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Psw>Usw | Pw>Ubi | Ut>Uow |
| Ra2/C | Fpr>Fkw | Px>Pw | Fhp>Fhw | Ps>Psw | Fhp>Fhw | Px>Pw |
| Ra2/D | Fpr>Fkw | Px>Pw | Fhp>Fhw | Fpr>Pw | Px | Pt>Ptw |
| Ra2/E | Px | Px>Pw | Px | Fpr>Pw | Px | Ut |
| Ra2/F | Pt | Pt>Ptw | Pt | Pt>Ptw | Pt | Ut |
| Ra3/C | Fkw | Pw | Fhw | Pw | Fhw | Pw |
| Ra3/D | Fkw | Pw | Fhw | Pw | Px | Ptw |
| Ra3/E | Px | Pw | Px | Pw | Px | Ut |
| Ra4/C | Fkw>Pw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Pw |
| Ra4/D | Fkw>Pw | Pw>Phw | Fhw>Phw | Pw | Px>Phw | Ptw |
| Ra5/B | Pdw | Phw | Phw | Pw | Phw | Pw |
| Ra5/C | Pw | Phw | Phw | Pw | Phw | Pw |
| Ra6/B | Pdw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Pw>Ubw |
| Ra6/C | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Pw>Ubw |
| Ra6/D | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Ptw>Ubw |
| Ryl/C | Pr | Pr | Fhr | Pkr | Fhr | Uf |
| Ryl/D | Pr | Pr | Fhr | Pkr | Px | Uf |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Ry1/F | Prt | Prt | Pt | Ux | Pt | Uft |
| Ry1/G | Ut | Ut | Ut | Ut | Ut | Uft |
| Ry2/D | Pr | Pr>Prw | Fhr>Px | Pkr>Ux | Px | Uf |
| Ry4/C | Fw>Pw | Prw>Pw | Px>Pw | Ux | Px>Phw | Uf |
| SM | Uiw | Uiw | Uiw | Uiw | Uiw | Uiw |
| Se3/B | Pi | Ui | Ui | Ui | Ui | Ui |
| Se3/C | Pi | Ui | Ui | Ui | Ui | Ui |
| Se4/A | Pi>Ui | Ui | Ui | Ui | Ui | Ui |
| Se4/B | Pi>Ui | Ui | Ui | Ui | Ui | Ui |
| Se4/C | Pi>Ui | Ui | Ui | Ui | Ui | Ui |
| Se5/A | Ui | Ui | Ui | Ui | Ui | Ui |
| Se5/B | Ui | Ui | Ui | Ui | Ui | Ui |
| Se6/A | Ui>Uiw | Ui>Ubw | Ui>Ubw | Ui>Usw | Ui>Ubi | Ui>Ubw |
| Se6/B | Ui>Uiw | Ui>Ubw | Ui>Ubw | Ui>Usw | Ui>Ubi | Ui>Ubw |
| Tm1/C | Fpr | Fhr | Fh | Fpr | Fhp | Px |
| Tm1/D | Fpr | Fhr | Fh | Fpr | Px | Pt |
| Tm1/E | Px | Px | Fht | Px | Px | Ut |
| Tm2/C | Fpr>Px | Fhr>Pw | Fh>Fhw | Fpr>Pw | Fhp>Px | Px>Pw |
| Tm2/D | Fpr>Px | Fhr>Pw | Fh>Fhw | Fpr>Pw | Px | Pt>Ptw |
| Tm2/E | Px | Px>Pw | Fht>Px | Px>Pw | Px | Ut |
| Tm2/F | Pt | Pt>Ptw | Px | Pt>Ptw | Pt | Ut |
| Tm3/C | Px | Pw | Fhw | Pw | Px | Pw |
| Tm3/D | Px | Pw | Fhw | Pw | Px | Ptw |
| Tm3/E | Px | Pw | Px | Pw | Px | Ut |
| Tm3/F | Pt | Pt>Ptw | Pt | Ptw | Pt | Ut |
| Tm4/B | Fkw>Pw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Pw |
| Tm4/C | Fkw>Pw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Pw |
| Tm5/C | Pw | Phw | Phw | Pw | Phw | Pw |
| Tm5/D | Pw | Phw | Phw | Pw | Phw | Ptw |
| Tm5/E | Pw | Phw | Phw | Pw | Phw | Ut |
| Tm6/B | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Pw>Ubw |
| Tm6/C | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Pw>Ubw |
| Tm6/D | Pw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Ptw>Ubw |
| Tu1/C | G | Fh | Fh | Pk | Fh | Pk |
| Tu1/D | G | Fh | Fh | Pk | Fht | Pkt |
| Tu1/E | Ft | Fht | Fht | Pk | Fht | Ut |
| Tu2/C | G>Fw | Fh>Pw | Fh>Fhw | Pk>Pw | Fh>Fhw | Pk>Pw |
| Tu2/D | G>Fw | Fh>Pw | Fh>Fhw | Pk>Pw | Fht>Fhw | Pkt>Ptw |
| Tu2/G | Ut | Ut | Ut | Ut | Ut | Ut |
| Tu3/B | Fw | Pw | Fhw | Pw | Fhw | Pw |
| Tu3/C | Fw | Pw | Fhw | Pw | Fhw | Pw |
| Tu3/D | Fw | Pw | Fhw | Pw | Px | Ptw |
| Tu3/E | Ftw | Pw | Px | Pw | Px | Ut |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (continued)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Tu4/C | Fw>Pw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Pw |
| Tu4/D | Fw>Pw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Ptw |
| Tu5/C | Pw | Phw | Phw | Pw | Phw | Pw |
| Tu5/D | Pw | Phw | Phw | Pw | Phw | Ptw |
| Tu5/E | Pw | Phw | Phw | Pw | Phw | Ut |
| Wb1/C | Fr | Fhr | Fh | Fr | Fh | Pf |
| Wb1/D | Fr | Fhr | Fh | Fr | Fht | Pft |
| Wb1/E | Frt | Px | Fht | Frt | Fht | Ut |
| Wb1/F | Pt | Pt | Pt | Pt | Pt | Ut |
| Wb2/C | Fr>Frw | Fhr>Pw | Fh>Fhw | Fr>Pw | Fh>Fhw | Pf>Pfw |
| Wb2/D | Fr>Frw | Fhr>Pw | Fh>Fhw | Fr>Pw | Fht>Px | Pft>Ux |
| Wb2/E | Frt>Frw | Px>Pw | Fht>Px | Frt>Pw | Fht>Px | Ut |
| Wb2/F | Pt | Pt>Ptw | Pt | Pt>Ptw | Pt | Ut |
| Wb3/C | Fw | Pw | Fhw | Pw | Fhw | Pfw |
| Wb3/D | Fw | Pw | Fhw | Pw | Px | Ux |
| Wb4/E | Fw>Pw | Pw | Fhw>Phw | Pw | Px>Pw | Ut |
| Wo1/C | Fk | Fhw | Fh | Fsw | Px | Px |
| Wo2/C | Fk>Pk | Fhw>Pw | Fh>Fhw | Fsw>Pw | Px | Px>Fft |
| Wo2/D | Fk>Pk | Fhw>Pw | Fh>Fhw | Fsw>Pw | Px | Pt |
| Wo2/E | Fk>Pk | Px>Pw | Fht>Px | Px>Pw | Px | Ut |
| Wo2/F | Pt>Pkt | Pt>Ptw | Pt | Pt>Ptw | Pt | Ut |
| Wo3/C | Pk | Pw | Fhw | Pw | Px | Fft |
| Wo3/D | Pk | Pw | Fhw | Pw | Px | Pt |
| Wo3/E | Pk | Pw | Px | Pw | Px | Ut |
| Wo4/C | Pk>Pkw | Pw | Fhw>Pw | Pw | Px>Pw | Fft |
| Wo4/D | Pk>Pkw | Pw | Fhw>Pw | Pw | Px>Pw | Pt |
| Wo5/B | Pkw | Pw | Pw | Pw | Pw | Ff |
| Wo5/C | Pkw | Pw | Pw | Pw | Pw | Fft |
| Wo5/D | Pkw | Pw | Pw | Pw | Pw | Pt |
| Wo6/B | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Pw>Usw | Pw>Ubi | Ff>Ubw |
| Wo6/C | Pkw>Uiw | Pw>Ubw | Pw>Ubw | Pw>Usw | Pw>Ubi | Fft>Ubw |
| Wd1/B | G | Fh | Fh | G | Fh | Pk |
| Wd1/C | G | Fh | Fh | G | Fh | Pk |
| Wd1/D | G | Fh | Fh | G | Fht | Pkt |
| Wd1/E | Ft | Fht | Fht | Ft | Fht | Ut |
| Wd2/C | G>Pk | Fh>Pw | Fh>Fhw | G>Pw | Fh>Fhw | Pk>Fbt |
| Wd2/D | G>Pk | Fh>Pw | Fh>Fhw | G>Pw | Fht>Px | Pkt>Pt |
| Wd2/E | Ft>Pk | Fht>Pw | Fht>Px | Ft>Pw | Fht>Px | Ut |
| Wd3/B | Pk | Pw | Fhw | Pw | Fhw | Fb |
| Wd3/C | Pk | Pw | Fhw | Pw | Fhw | Fbt |
| Wd3/D | Pk | Pw | Fhw | Pw | Px | Pt |
| Wd3/E | Pk | Pw | Fhw | Pw | Px | Ut |
| Wd4/C | Pk>Pkw | Pw>Phw | Fhw>Phw | Pw | Fhw>Phw | Fbt |

(continued)

Table 15. SOIL INTERPRETATIONS FOR COMMUNITY DEVELOPMENT (concluded)

| Map symbol | On-site sewage disposal | Housing | | Sanitary landfill | Roads and streets | Sewage lagoons |
|---|---|---|---|---|---|---|
| | | With basements | Without basements | | | |
| Wd4/D | Pk>Pkw | Pw>Phw | Fhw>Phw | Pw | Px>Phw | Pt |
| Wd4/E | Pk>Pkw | Pw>Phw | Px>Phw | Pw | Px>Phw | Ut |
| Wd5/B | Ux | Phw | Phw | Pw | Phw | Fb |
| Wd5/C | Pkw | Phw | Phw | Pw | Phw | Fbt |
| Wd6/C | Pkw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Fbt>Ubw |
| Wd6/E | Pkw>Uiw | Phw>Ubw | Phw>Ubw | Pw>Usw | Phw>Ubi | Ut>Ubw |
| Wn1/C | Ppr | Ppr | Pp | Ux | Pp | Uf |
| Wn1/D | Ppr | Ppr | Pp | Ux | Pp | Uf |
| Wn1/E | Ppr | Ppr | Pp | Ux | Pp | Uft |
| Wn1/F | Ux | Ux | Ppt | Ux | Ppt | Uft |
| Wn1/G | Ut | Ut | Ut | Ut | Ut | Uft |
| Wn2/C | Ppr>Pp | Ppr>Ppw | Pp | Ux | Pp | Uf |
| Wn2/D | Ppr>Pp | Ppr>Ppw | Pp | Ux | Pp | Uf |
| Wn2/E | Ppr>Pp | Ppr>Ppw | Pp | Ux | Pp | Uf |
| Wn2/F | Ux>Ppt | Ux | Ppt | Ux | Ppt | Uft |
| Wn2/G | Ut | Ut | Ut | Ut | Ut | Uft |
| Wn3/C | Pp | Ppw | Pp | Ux | Pp | Uf |
| Wn3/D | Pp | Ppw | Pp | Ux | Pp | Uf |
| Wn3/E | Pp | Ppw | Pp | Ux | Pp | Uft |
| Wn3/F | Ppt | Ux | Ppt | Ux | Ppt | Uft |
| Wn4/B | Pp>Ppw | Ppw>Ux | Pp>Ux | Ux | Pp>Ux | Uf |
| Wn4/C | Pp>Ppw | Ppw>Ux | Pp>Ux | Ux | Pp>Ux | Uf |
| Wn4/D | Pp>Ppw | Ppw>Ux | Pp>Ux | Ux | Pp>Ux | Uf |
| Wn5/C | Ppw | Ux | Ux | Ux | Ux | Uf |
| Wn5/D | Ppw | Ux | Ux | Ux | Ux | Uf |
| Wn5/E | Ppw | Ux | Ux | Ux | Ux | Uf |
| Wn6/C | Ppw>Uiw | Ux>Ubw | Ux>Ubw | Ux>Usw | Ux>Ubi | Uf>Ubw |
| Wn6/D | Ppw>Uiw | Ux>Ubw | Ux>Ubw | Ux>Usw | Ux>Ubi | Uf>Ubw |

## FORESTRY

The interpretations for forest soils are related to woodland management. The degree of suitability: good, fair, or poor are determined for forestry-road construction, off-road use of harvesting equipment, and resistance to windthrow. Relative ratings of high, moderate, and low are determined graphically for assessing erosion hazard. Recommended tree species to plant for reforestation are also presented.

Because these interpretations are based on soil survey information collected for various reasons, the soils may be differentiated more than would be necessary for forestry use alone. Many of the mapping units have the same or similar degrees of limitation for various forestry uses and could be grouped into single forest-soil management units.

### Forestry-road construction

Forestry roads are required to provide access to the work area and their construction is a significant component in all forest management plans.

Structurally, a road consists of two parts; the pavement and the subgrade. The pavement consists of all material placed on the road above the subgrade and for many forestry roads may be absent or consist of a single layer of gravel.

The subgrade consists of soil material that occurs naturally on or near the road right-of-way. In cut sections, the subgrade material is undisturbed, except possibly for some compaction. In fill sections the subgrade material is transported from nearby cuts or borrow pits and is built up and compacted to the desired elevation (McFarlane et al. 1968).

Forestry roads include main roads, secondary roads, branch roads, and access spurs. These roads have different dimensions for their design elements (University of British Columbia Forestry Club 1971), but their construction and performance are influenced by the same soil factors.

Soil factors that influence the ease of construction of forestry roads from the adjacent soil material are soil drainage, particle size (as inferred by the Unified classification), slope, depth to bedrock, rockiness, stoniness, and flooding. Soil factors affecting the performance of road systems after construction are particle size, soil drainage, and flooding.

The soil criteria and classes used in this interpretation are presented in Table 16.

## Off-road use of harvesting equipment

This rating indicates the degree to which soil and site factors influence the off-road trafficability of equipment used in forestry operations. The ratings indicate the degree of difficulty expected in operating harvesting machinery under various soil conditions and the potential soil damage that might occur during and after its use. Soil damage is caused by compaction, rutting, displacement, and soil erosion, which can contribute to losses in forest productivity.

Soil and site factors that influence off-road trafficability are soil drainage, soil strength (as inferred in the Unified classification), slope, rockiness, and surface stoniness.

It is assumed that rubber-tired skidders and forwarders are used. Table 17 presents the criteria and classes used in this interpretation.

## Resistance to windthrow

Windthrow refers to the uprooting of trees by wind. Windthrow kills potentially merchantable stands of timber, and affected areas are particularly susceptible to infestations of insects and wood-rotting fungi that may then spread to healthy stands.

Under ideal conditions in undisturbed forest the root systems of trees are usually adequate to resist windthrow. Hardwood stands or mixed stands are generally more resistant to windthrow than softwood stands. Trees become susceptible to windthrow when harvesting opens up and exposes trees to the wind. For example the occurrence of windthrow increases along the edges of road right-of-ways and clear cuts. Although increased exposure raises the risk of windthrow, the physical conditions of the rooting medium strongly influences a trees ability to anchor itself and resist being uprooted.

The soil characteristics that affect the anchoring ability of tree roots are soil drainage, depth to rooting restrictions, and soil texture in the rooting zone.

Table 18 presents the criteria and classes used to make this interpretation.

## Soil erosion hazard

Soil erosion is the detachment and downhill transport of soil particles by running water. Soil losses caused by water erosion are a function of rainfall intensity and duration, vegetation cover, slope gradient and length, and soil characteristics that determine a soil's erodibility.

In making this interpretation only the soil factors and slope gradient of each map unit are considered.

Areas of mineral soil are exposed by extensive site preparation by scarification, by dense road systems, and by intense forest fires which remove the surface organic layers.

Soil factors that influence soil erodibility are texture, organic matter content, soil structure, and permeability.

An estimate of soil erodibility for each soil association was derived from the soil erodibility nomograph in Fig. 10 (Wischmeier et al. 1971). The soil erodibility rating (K factor) and associated map unit slope were then used to determine the erosion hazard from Fig. 11 (Coen and Holland 1976). The erosion hazard for each map unit is presented (see Table 19).

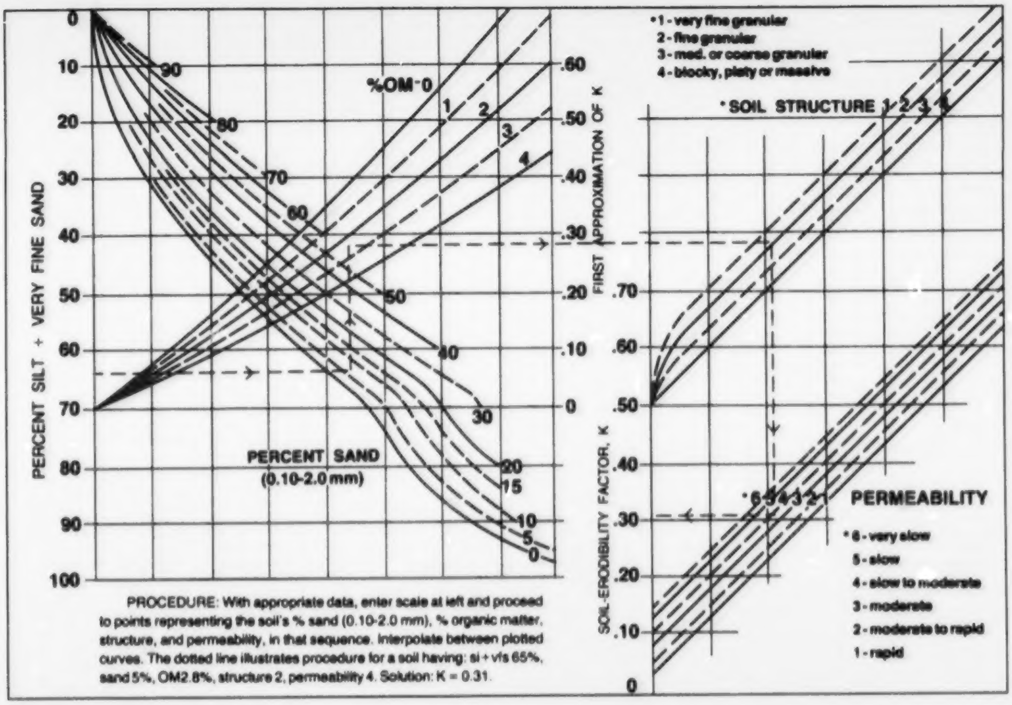
### Tree species to plant

The replanting of cutover land with tree seedlings grown in forest nurseries is a widely used method of artificial reforestation. Choosing a suitable tree species to plant is the most important decision in establishing a new stand. The species chosen should be adapted to the climate, soil, and biotic environment of the site. The species selected from those suited to the site should be the ones that promise the best net return (Smith 1962).

This interpretation, made using a modified version of the Nova Scotia Department of Lands and Forests (no date) "Species to plant key" (Fig. 12), assumes that browsing is not a problem and that site preparation is undertaken where ericaceous shrubs pose a threat to successful stand establishment.

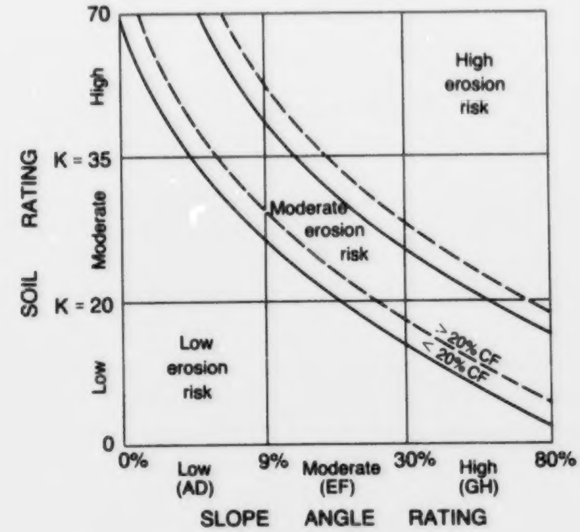
Only the top three tree species listed in each box in the "Species to plant key" (see Fig. 12) are recorded in Table 19. Compound map units typically have two sets of tree species listed.

Table 19 presents, for each map unit, the complete soil interpretations for forestry.



PROCEDURE: With appropriate data, enter scale at left and proceed to points representing the soil's % sand (0.10-2.0 mm), % organic matter, structure, and permeability, in that sequence. Interpolate between plotted curves. The dotted line illustrates procedure for a soil having: si + vfs 65%, sand 5%, OM 2.8%, structure 2, permeability 4. Solution: K = 0.31.

Fig. 10. Soil-erodibility nomograph (Wischmeier et al. 1971).



Soils with greater than 20% coarse fragments (CF ~ 2 mm to 25 cm) are less susceptible to erosion and the band between the dashed lines indicates moderate erosion risk in such cases.

Fig. 11. Erosion hazard of soils (Coen and Holland 1976).

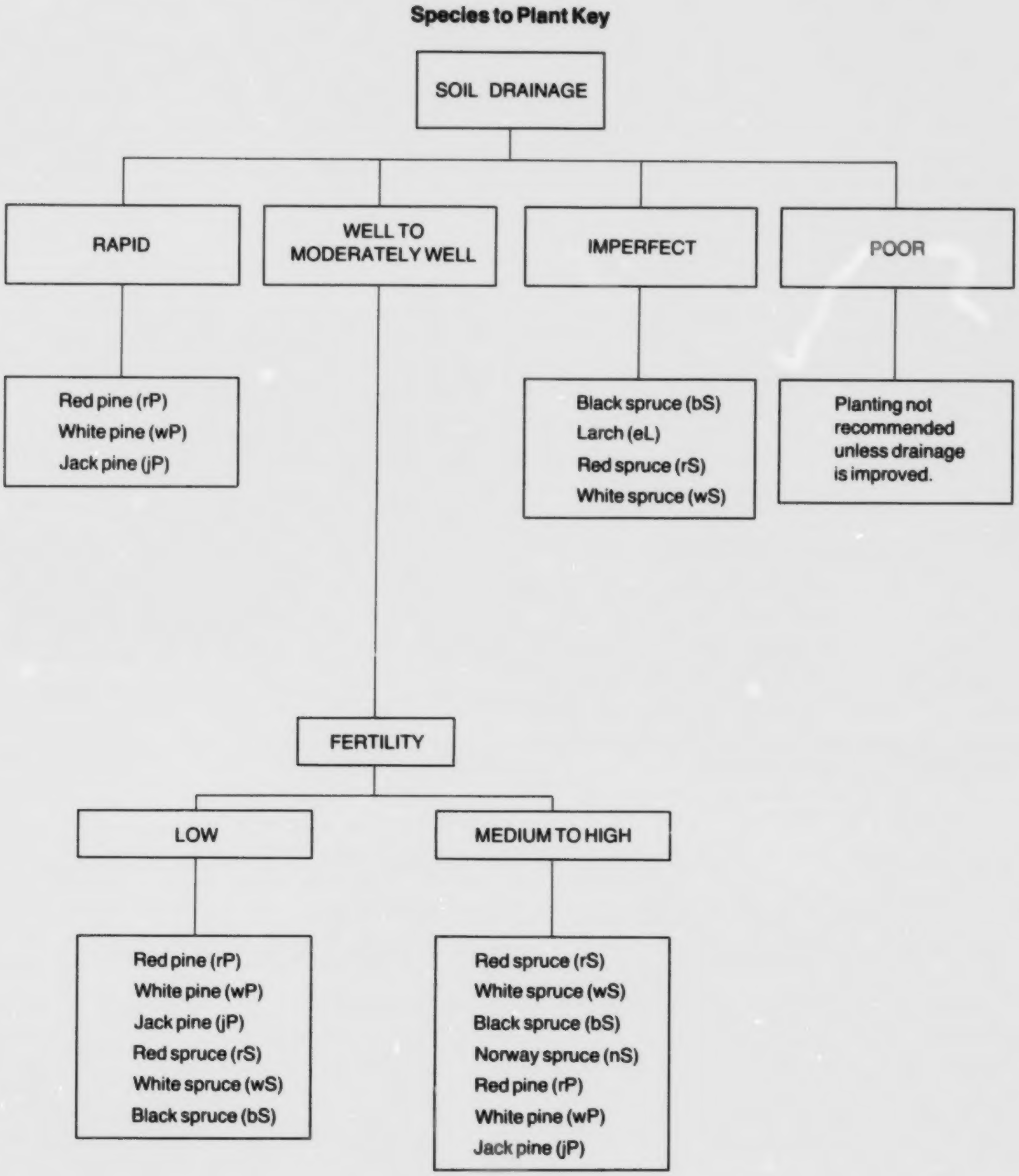

Species to Plant Key
SOIL DRAINAGE
RAPID
WELL TO MODERATELY WELL
IMPERFECT
POOR
Red pine (rP)
White pine (wP)
Jack pine (jP)
Black spruce (bS)
Larch (eL)
Red spruce (rS)
White spruce (wS)
Planting not recommended unless drainage is improved.
FERTILITY
LOW
MEDIUM TO HIGH
Red pine (rP)
White pine (wP)
Jack pine (jP)
Red spruce (rS)
White spruce (wS)
Black spruce (bS)
Red spruce (rS)
White spruce (wS)
Black spruce (bS)
Norway spruce (nS)
Red pine (rP)
White pine (wP)
Jack pine (jP)

Fig. 12. Tree species selection for reforestation (modified from Nova Scotia Department of Lands and Forests "Species to plant key").

Table 16. Soil suitability for forestry road construction

| Soil factors[1] (limitation symbol) | Degree of suitability | | |
|---|---|---|---|
| | Good | Fair | Poor |
| Flooding (i) | 1 in 5 yr | 1 in 3 yr | yearly |
| Stoniness[2] (p) | 0-3 | 4 | 5 |
| Slope, % (t) | <9 | 9-30 | >30 |
| Rockiness[2] (r) | 0-1 | 2-3 | 4-5 |
| Subgrade[3] (b) | | | |
| - AASHO class | A-1,A-2,A-3 | A-4,A-5 | A-6,A-7 |
| - Unified class | GW,GP,SW<br>SP,(GM,GC<br>SM,SC)[4] | ML<br>CL(PI<15) | MH,OL,CH<br>OH,Pt<br>CL(PI>15) |
| Drainage[2] (w) | R,W,MW | I[5] | P,VP |

Source: Vold 1981.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] See Appendix 4 for description of Unified and AASHO soil classification systems.

[4] Downgrade to fair if >35% passes the No. 200 sieve and if road construction and use are in the spring.

[5] Upgrade one class for gravelly to very gravelly soils.

Table 17. Soil suitability for off-road use of harvesting equipment

| Soil factors[1] (limitation symbol) | Degree of suitability | | |
|---|---|---|---|
| | Good | Fair | Poor |
| Drainage[2] (w) | R,W,MW | I | P,VP |
| Unified class[3] (b) | GW,GP,SW,SP<br>(GM,GC,SM)[4] | SC,ML,CL | MH,CH,OL<br>OH,Pt |
| Slope,[2] % (t) | <9% | 10-30 | >30 |
| Rockiness[2] (r) | 0,1 | 2,3 | 4,5 |
| Stoniness[2] (p) | 0-3 | 4 | 5 |

Sources: Vold 1981, Wang and Rees 1983.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] See Appendix 4 for description of Unified and AASHO soil classification systems.

[4] Downgrade to fair if >35% passes the No. 200 sieve and if equipment is used in the spring.

Table 18. Soil resistance to windthrow

| Soil factors[1] (limitation symbol) | Degree of resistance | | |
|---|---|---|---|
| | Good | Fair | Poor |
| Drainage[2] (w) | R,W,MW | I | P,VP |
| Rooting depth,[3] cm (d) | >50 | 20-50 | <20 |

Source: Vold 1981, Wang and Rees 1983.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] Downgrade one class for fine loamy and clayey (>18% clay) particle sizes in the rooting zone.

Table 19. SOIL INTERPRETATIONS FOR FORESTRY

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Ac4/A | Fbw>Pw | Fbw>Pw | * NR | L | do not plant |
| Ac4/B | Fbw>Pw | Fbw>Pw | NR | L | do not plant |
| Ac5/A | Pw | Pw | NR | L | do not plant |
| Ac6/A | Pw>Pbw | Pw>Pbw | NR | L | do not plant |
| Ct/A | Pbw | Pbw | Pw | NR | do not plant |
| Cd1/C | Fr | Fr | G | L | rS,wS,bS |
| Cd1/D | Fr | Fr | G | L | rS,wS,bS |
| Cd1/E | Frt | Frt | G | M | rS,wS,bS |
| Cd1/F | Frt | Frt | G | M | rS,wS,bS |
| Cd1/G | Pt | Pt | G | H | rS,wS,bS |
| Cd2/C | Fr>G | Fr>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Cd2/D | Fr>G | Fr>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Cd2/E | Frt>Ft | Frt>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Cd2/F | Frt>Ft | Frt>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Cd2/G | Pt | Pt | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Cd3/B | G | Fw | Fw | L | bS,eL,rS |
| Cd3/C | G | Fw | Fw | L | bS,eL,rS |
| Cd3/D | G | Fw | Fw | L | bS,eL,rS |
| Cd3/E | Ft | Ftw | Fw | M | bS,eL,rS |
| Cd3/F | Ft | Ftw | Fw | M | bS,eL,rS |
| Cd4/B | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cd4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cd4/D | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cd4/E | Ft>Pw | Ftw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Cd5/C | Pw | Pw | Pw | L | do not plant |
| Cd5/D | Pw | Pw | Pw | L | do not plant |
| Cd5/E | Pw | Pw | Pw | M | do not plant |
| Cd6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Cd6/D | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Cb | Ui | NR | NR | NR | do not plant |
| Cm1/A | Pi | G | G | L | rS,wS,bS |
| Cm1/B | Pi | G | G | L | rS,wS,bS |
| Cm1/C | Pi | G | G | L | rS,wS,bS |
| Cm2/B | Pi | G>Fw | G | L | rS,wS,bS;bS,eL,rS |
| Cm3/B | Pi | Fw | Fw | L | bS,eL,rS |
| Cm3/C | Pi | Fw | Fw | L | bS,eL,rS |
| Cm3/D | Pi | Fw | Fw | L | bS,eL,rS |
| Cm4/B | Pi>Piw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cm4/C | Pi>Piw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cm4/D | Pi>Piw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Cm5/A | Piw | Pw | Pw | L | do not plant |
| Cm5/B | Piw | Pw | Pw | L | do not plant |
| Cm5/C | Piw | Pw | Pw | L | do not plant |
| Cm6/A | Piw>Pbw | Pw>Pbw | Pw | L | do not plant |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Cm6/B | Piw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Cm6/C | Piw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Dg3/D | Fb | Fbw | Fdw | M | bS,eL,rS |
| Dg3/E | Fbt | Px | Fdw | M | bS,eL,rS |
| Dg3/F | Fbt | Px | Fdw | H | bS,eL,rS |
| Dg4/C | Fb>Pw | Fbw>Pw | Fdw>Pw | L | bS,eL,rS;do not plant |
| Dg4/D | Fb>Pw | Fbw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Dg4/E | Fbt>Pw | Px>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Dg4/F | Fbt>Pw | Px>Pw | Fdw>Pw | H | bS,eL,rS;do not plant |
| Dg5/B | Pw | Pw | Pw | L | do not plant |
| Dg5/C | Pw | Pw | Pw | L | do not plant |
| Dg5/D | Pw | Pw | Pw | M | do not plant |
| Fs4/B | Fbw>Pw | Fbw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Fs4/C | Fbw>Pw | Fbw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Fs5/B | Pw | Pw | Pw | M | do not plant |
| Fs5/C | Pw | Pw | Pw | M | do not plant |
| Fs6/B | Pw>Pbw | Pw>Pbw | Pw | M | do not plant |
| Fo1/A | G | G | G | L | rS,wS,bS |
| Fo1/C | G | G | G | L | rS,wS,bS |
| Fo1/G | Pt | Pt | G | H | rS,wS,bS |
| Fo2/D | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Fo2/E | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Fo2/F | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Fo2/G | Pt | Pt | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Fo3/C | G | Fw | Fw | L | bS,eL,rS |
| Fo3/D | G | Fw | Fw | L | bS,eL,rS |
| Fo3/E | Ft | Ftw | Fw | M | bS,eL,rS |
| Fo4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Fo4/D | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Fo5/C | Pw | Pw | Pw | L | do not plant |
| Fo5/D | Pw | Pw | Pw | L | do not plant |
| Hd1/E | Ft | Ft | G | M | rS,wS,bS |
| Hd1/F | Ft | Ft | G | H | rS,wS,bS |
| Hd2/D | G | G>Fw | G>Fdw | M | rS,wS,bS;bS,eL,rS |
| Hd2/E | Ft | Ft>Ftw | G>Fdw | M | rS,wS,bS;bS,eL,rS |
| Hd3/C | G | Fw | Fdw | L | bS,eL,rS |
| Hd3/D | G | Fw | Fdw | M | bS,eL,rS |
| Hd4/C | G>Pw | Fw>Pw | Fdw>Pw | L | bS,eL,rS;do not plant |
| Hd4/D | G>Pw | Fw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Hd5/C | Pw | Pw | Pw | L | do not plant |
| Hd5/D | Pw | Pw | Pw | M | do not plant |
| He1/B | G | G | G | L | rP,wP,jP |
| He1/C | G | G | G | L | rP,wP,jP |
| He1/D | G | G | G | L | rP,wP,jP |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| He1/E | Ft | Ft | G | L | rP,wP,jP |
| He1/F | Ft | Ft | G | L | rP,wP,jP |
| He1/G | Pt | Pt | G | M | rP,wP,jP |
| He2/B | G | G>Fw | G>Fw | L | rP,wP,jP;bS,eL,rS |
| He2/C | G | G>Fw | G>Fw | L | rP,wP,jP;bS,eL,rS |
| He2/D | G | G>Fw | G>Fw | L | rP,wP,jP;bS,eL,rS |
| He2/E | Ft | Ft>Ftw | G>Fw | L | rP,wP,jP;bS,eL,rS |
| He2/F | Ft | Ft>Ftw | G>Fw | L | rP,wP,jP;bS,eL,rS |
| He2/G | Pt | Pt | G>Fw | M | rP,wP,jP;bS,eL,rS |
| He3/B | G | Fw | Fw | L | bS,eL,rS |
| He3/C | G | Fw | Fw | L | bS,eL,rS |
| He3/D | G | Fw | Fw | L | bS,eL,rS |
| He3/E | Ft | Ftw | Fw | L | bS,eL,rS |
| He4/B | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| He4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| He4/D | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| He5/B | Pw | Pw | Pw | L | do not plant |
| He5/C | Pw | Pw | Pw | L | do not plant |
| He5/D | Pw | Pw | Pw | L | do not plant |
| He6/B | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| He6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| He7/C | G>Pw | G>Pw | G>Pw | L | rP,wP,jP;do not plant |
| He7/D | G>Pw | G>Pw | G>Pw | L | rP,wP,jP;do not plant |
| Kh1/D | G | G | G | L | rS,wS,bS |
| Kh1/F | Ft | Ft | G | M | rS,wS,bS |
| Kh2/D | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Kh2/E | Ft | Ft>Ftw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Kh2/F | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Kh3/D | G | Fw | Fw | L | bS,eL,rS |
| Kh3/E | Ft | Ftw | Fw | L | bS,eL,rS |
| Kh4/E | Ft>Pw | Ftw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Kh6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Mi2/C | Fbw>Fb | Fbw>Fb | Fw>G | L | bS,eL,rS;rS,wS,bS |
| Mi2/D | Fbw>Fb | Fbw>Fb | Fw>G | M | bS,eL,rS;rS,wS,bS |
| Mi2/E | Px>Fbt | Px>Fbt | Fw>G | M | bS,eL,rS;rS,wS,bS |
| Mi3/C | Fbw | Fbw | Fw | L | bS,eL,rS |
| Mi3/D | Fbw | Fbw | Fw | M | bS,eL,rS |
| Mi3/E | Px | Px | Fw | M | bS,eL,rS |
| Mi4/B | Fbw>Pw | Fbw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Mi4/C | Fbw>Pw | Fbw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Mi4/D | Fbw>Pw | Fbw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Mi4/E | Px>Pw | Px>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Mi4/F | Px>Pw | Px>Pw | Fw>Pw | H | bS,eL,rS;do not plant |
| Mi5/B | Pw | Pw | Pw | L | do not plant |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Mi5/C | Pw | Pw | Pw | L | do not plant |
| Mi5/D | Pw | Pw | Pw | M | do not plant |
| Mi6/B | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Mi6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Pp2/C | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Pp2/D | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Pp2/E | Ft | Ft>Ftw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Pp2/F | Ft | Ft>Ftw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Pp2/G | Pt | Pt | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Pp3/C | G | Fw | Fw | L | bS,eL,rS |
| Pp3/D | G | Fw | Fw | L | bS,eL,rS |
| Pp3/E | Ft | Ftw | Fw | L | bS,eL,rS |
| Pp4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Pp4/D | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Pp5/C | Pw | Pw | Pw | L | do not plant |
| Ph1/C | Fpr | Fpr | G | L | rS,wS,bS |
| Ph1/D | Fpr | Fpr | G | M | rS,wS,bS |
| Ph2/C | Fpr | Fpr>Px | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Ph2/D | Fpr | Fpr>Px | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Ph2/E | Px | Px | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Ph3/C | Fpr | Px | Fw | L | bS,eL,rS |
| Ph3/D | Fpr | Px | Fw | M | bS,eL,rS |
| Ph4/C | Fpr>Pw | Px>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Ph4/D | Fpr>Pw | Px>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Ph4/E | Px>Pw | Px>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Ph5/B | Pw | Pw | Pw | L | do not plant |
| Ph5/C | Pw | Pw | Pw | L | do not plant |
| Ph5/D | Pw | Pw | Pw | M | do not plant |
| Ph6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Ph7/C | Fpr>Pw | Fpr>Pw | Fw>Pw | L | rS,wS,bS;do not plant |
| Pw1/A | Fb | Fb | G | L | rS,wS,bS |
| Pw1/B | Fb | Fb | G | L | rS,wS,bS |
| Pw1/C | Fb | Fb | G | M | rS,wS,bS |
| Pw1/D | Fb | Fb | G | M | rS,wS,bS |
| Pw1/E | Fbt | Fbt | G | H | rS,wS,bS |
| Pw2/C | Fb>Fbw | Fb>Fbw | G>Fdw | M | rS,wS,bS;bS,eL,rS |
| Pw2/D | Fb>Fbw | Fb>Fbw | G>Fdw | M | rS,wS,bS;bS,eL,rS |
| Pw3/B | Fbw | Fbw | Fdw | L | bS,eL,rS |
| Pw3/C | Fbw | Fbw | Fdw | M | bS,eL,rS |
| Pw3/D | Fbw | Fbw | Fdw | M | bS,eL,rS |
| Pw3/E | Px | Px | Fdw | H | bS,eL,rS |
| Pw4/C | Fbw>Pw | Fbw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Pw4/D | Fbw>Pw | Fbw>Pw | Fdw>Pw | M | bS,eL,rS;do not plant |
| Pw5/B | Pw | Pw | Pw | L | do not plant |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Pw5/C | Pw | Pw | Pw | M | do not plant |
| Pw5/D | Pw | Pw | Pw | M | do not plant |
| Pw6/B | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Pw6/C | Pw>Pbw | Pw>Pbw | Pw | M | do not plant |
| Qu2/D | Fbw>Fb | Fbw>Fb | Pd>Fd | M | bS,eL,rS;rS,wS,bS |
| Qu3/B | Fbw | Fbw | Pd | L | bS,eL,rS |
| Qu3/C | Fbw | Fbw | Pd | M | bS,eL,rS |
| Qu3/D | Fbw | Fbw | Pd | M | bS,eL,rS |
| Qu3/E | Px | Px | Pd | H | bS,eL,rS |
| Qu3/F | Px | Px | Pd | H | bS,eL,rS |
| Qu3/G | Pt | Pt | Pd | H | bS,eL,rS |
| Qu4/B | Fbw>Pw | Fbw>Pw | Pd>Pdw | L | bS,eL,rS;do not plant |
| Qu4/C | Fbw>Pw | Fbw>Pw | Pd>Pdw | M | bS,eL,rS;do not plant |
| Qu4/D | Fbw>Pw | Fbw>Pw | Pd>Pdw | M | bS,eL,rS;do not plant |
| Qu4/E | Px>Pw | Px>Pw | Pd>Pdw | H | bS,eL,rS;do not plant |
| Qu5/B | Pw | Pw | Pdw | L | do not plant |
| Qu5/C | Pw | Pw | Pdw | M | do not plant |
| Qu5/D | Pw | Pw | Pdw | M | do not plant |
| Qu5/E | Pw | Pw | Pdw | H | do not plant |
| Qu6/B | Pw>Pbw | Pw>Pbw | Pdw>Pw | L | do not plant |
| Qu6/C | Pw>Pbw | Pw>Pbw | Pdw>Pw | M | do not plant |
| Qu6/D | Pw>Pbw | Pw>Pbw | Pdw>Pw | M | do not plant |
| Qu6/E | Pw>Pbw | Pw>Pbw | Pdw>Pw | H | do not plant |
| Ra2/C | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Ra2/D | G | G>Fw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Ra2/E | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Ra2/F | Ft | Ft>Ftw | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Ra3/C | G | Fw | Fw | L | bS,eL,rS |
| Ra3/D | G | Fw | Fw | M | bS,eL,rS |
| Ra3/E | Ft | Ftw | Fw | M | bS,eL,rS |
| Ra4/C | G>Pw | Fw>Pw | Fw>Pdw | L | bS,eL,rS;do not plant |
| Ra4/D | G>Pw | Fw>Pw | Fw>Pdw | M | bS,eL,rS;do not plant |
| Ra5/B | Pw | Pw | Pdw | L | do not plant |
| Ra5/C | Pw | Pw | Pdw | L | do not plant |
| Ra6/B | Pw>Pbw | Pw>Pbw | Pdw>Pw | L | do not plant |
| Ra6/C | Pw>Pbw | Pw>Pbw | Pdw>Pw | L | do not plant |
| Ra6/D | Pw>Pbw | Pw>Pbw | Pdw>Pw | M | do not plant |
| Ry1/C | Fr | Fr | Fd | L | rS,wS,bS |
| Ry1/D | Fr | Fr | Fd | M | rS,wS,bS |
| Ry1/F | Frt | Frt | Fd | M | rS,wS,bS |
| Ry1/G | Pt | Pt | Fd | H | rS,wS,bS |
| Ry2/D | Fr | Fr>Frw | Fd>Fdw | L | rS,wS,bS;bS,eL,rS |
| Ry4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| SM | NR | NR | NR | NR | do not plant |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Se3/B | Pi | Fbw | Fw | M | bS,eL,rS |
| Se3/C | Pi | Fbw | Fw | M | bS,eL,rS |
| Se4/A | Pi>Piw | Fbw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Se4/B | Pi>Piw | Fbw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Se4/C | Pi>Piw | Fbw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Se5/A | Piw | Pw | Pw | L | do not plant |
| Se5/B | Piw | Pw | Pw | M | do not plant |
| Se6/A | Piw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Se6/B | Piw>Pbw | Pw>Pbw | Pw | M | do not plant |
| Tm1/C | G | G | G | L | rS,wS,bS |
| Tm1/D | G | G | G | L | rS,wS,bS |
| Tm1/E | Ft | Ft | G | M | rS,wS,bS |
| Tm2/C | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Tm2/D | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Tm2/E | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Tm2/F | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Tm3/C | G | Fw | Fw | L | bS,eL,rS |
| Tm3/D | G | Fw | Fw | L | bS,eL,rS |
| Tm3/E | Ft | Ftw | Fw | M | bS,eL,rS |
| Tm3/F | Ft | Ftw | Fw | M | bS,eL,rS |
| Tm4/B | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Tm4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Tm5/C | Pw | Pw | Pw | L | do not plant |
| Tm5/D | Pw | Pw | Pw | L | do not plant |
| Tm5/E | Pw | Pw | Pw | M | do not plant |
| Tm6/B | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Tm6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Tm6/D | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Tu1/C | G | G | G | M | rS,wS,bS |
| Tu1/D | G | G | G | M | rS,wS,bS |
| Tu1/E | Ft | Ft | G | H | rS,wS,bS |
| Tu2/C | G>Fw | G>Fw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Tu2/D | G>Fw | G>Fw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Tu2/G | Pt | Pt | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Tu3/B | Fw | Fw | Fw | L | bS,eL,rS |
| Tu3/C | Fw | Fw | Fw | M | bS,eL,rS |
| Tu3/D | Fw | Fw | Fw | M | bS,eL,rS |
| Tu3/E | Ftw | Ftw | Fw | H | bS,eL,rS |
| Tu4/C | Fw>Pw | Fw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Tu4/D | Fw>Pw | Fw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Tu5/C | Pw | Pw | Pw | M | do not plant |
| Tu5/D | Pw | Pw | Pw | M | do not plant |
| Tu5/E | Pw | Pw | Pw | H | do not plant |
| Wb1/C | G | G | G | L | rS,wS,bS |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (continued)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Wb1/D | G | G | G | L | rS,wS,bS |
| Wb1/E | Ft | Ft | G | M | rS,wS,bS |
| Wb1/F | Ft | Ft | G | M | rS,wS,bS |
| Wb2/C | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Wb2/D | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Wb2/E | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wb2/F | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wb3/C | G | Fw | Fw | L | bS,eL,rS |
| Wb3/D | G | Fw | Fw | L | bS,eL,rS |
| Wb4/E | Ft>Pw | Ftw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Wo1/C | G | G | G | L | rS,wS,bS |
| Wo2/C | G | G>Fw | G>Fw | L | rS,wS,bS;bS,eL,rS |
| Wo2/D | G | G>Fw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wo2/E | Ft | Ft>Ftw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wo2/F | Ft | Ft>Ftw | G>Fw | H | rS,wS,bS;bS,eL,rS |
| Wo3/C | G | Fw | Fw | L | bS,eL,rS |
| Wo3/D | G | Fw | Fw | M | bS,eL,rS |
| Wo3/E | Ft | Ftw | Fw | M | bS,eL,rS |
| Wo4/C | G>Pw | Fw>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Wo4/D | G>Pw | Fw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Wo5/B | Pw | Pw | Pw | L | do not plant |
| Wo5/C | Pw | Pw | Pw | L | do not plant |
| Wo5/D | Pw | Pw | Pw | M | do not plant |
| Wo6/B | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Wo6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Wd1/B | Fb | Fb | G | L | rS,wS,bS |
| Wd1/C | Fb | Fb | G | M | rS,wS,bS |
| Wd1/D | Fb | Fb | G | M | rS,wS,bS |
| Wd1/E | Fbt | Fbt | G | M | rS,wS,bS |
| Wd2/C | Fb>Fbw | Fb>Fbw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wd2/D | Fb>Fbw | Fb>Fbw | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wd2/E | Fbt>Px | Fbt>Px | G>Fw | M | rS,wS,bS;bS,eL,rS |
| Wd3/B | Fbw | Fbw | Fw | L | bS,eL,rS |
| Wd3/C | Fbw | Fbw | Fw | M | bS,eL,rS |
| Wd3/D | Fbw | Fbw | Fw | M | bS,eL,rS |
| Wd3/E | Px | Px | Fw | M | bS,eL,rS |
| Wd4/C | Fbw>Pw | Fbw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Wd4/D | Fbw>Pw | Fbw>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Wd4/E | Px>Pw | Px>Pw | Fw>Pw | M | bS,eL,rS;do not plant |
| Wd5/B | Pw | Pw | Pw | L | do not plant |
| Wd5/C | Pw | Pw | Pw | M | do not plant |
| Wd6/C | Pw>Pbw | Pw>Pbw | Pw | M | do not plant |
| Wd6/E | Pw>Pbw | Pw>Pbw | Pw | M | do not plant |
| Wn1/C | Fpr | Fpr | G | L | rP,wP,jP |

(continued)

Table 19. SOIL INTERPRETATIONS FOR FORESTRY (concluded)

| Map symbol | Forestry roads | Off-road use of equipment | Windthrow resistance | Erosion hazard | Species to plant |
|---|---|---|---|---|---|
| Wn1/D | Fpr | Fpr | G | L | rP,wP,jP |
| Wn1/E | Px | Px | G | M | rP,wP,jP |
| Wn1/F | Px | Px | G | M | rP,wP,jP |
| Wn1/G | Pt | Pt | G | H | rP,wP,jP |
| Wn2/C | Fpr | Fpr>Px | G>Fw | L | rP,wP,jP;bS,eL,rS |
| Wn2/D | Fpr | Fpr>Px | G>Fw | L | rP,wP,jP;bS,eL,rS |
| Wn2/E | Px | Px | G>Fw | M | rP,wP,jP;bS,eL,rS |
| Wn2/F | Px | Px | G>Fw | M | rP,wP,jP;bS,eL,rS |
| Wn2/G | Pt | Pt | G>Fw | H | rP,wP,jP;bS,eL,rS |
| Wn3/C | Fpr | Px | Fw | L | bS,eL,rS |
| Wn3/D | Fpr | Px | Fw | L | bS,eL,rS |
| Wn3/E | Px | Px | Fw | M | bS,eL,rS |
| Wn3/F | Px | Px | Fw | M | bS,eL,rS |
| Wn4/B | Fpr>Pw | Px>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Wn4/C | Fpr>Pw | Px>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Wn4/D | Fpr>Pw | Px>Pw | Fw>Pw | L | bS,eL,rS;do not plant |
| Wn5/C | Pw | Pw | Pw | L | do not plant |
| Wn5/D | Pw | Pw | Pw | L | do not plant |
| Wn5/E | Pw | Pw | Pw | M | do not plant |
| Wn6/C | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |
| Wn6/D | Pw>Pbw | Pw>Pbw | Pw | L | do not plant |

*NR - not rated

## SOIL AS A SOURCE OF MATERIAL

Apart from being used on location, soils are also sources for material. The suitability of the soil as a source of topsoil (for landscaping), gravel, and roadfill are rated for each mapping unit.

### Topsoil

Topsoil is soil material that is used to improve the surface soil conditions of an area for plant growth and is used for establishing lawns and gardens, and for the revegetation of roadbanks and other landscaped sites. The suitability of a soil for topsoil might influence the decision to stockpile surface soil at construction sites or look for a better source nearby.

The criteria used to determine the degree of suitability are those factors related to the ease or difficulty in obtaining the material (thickness of the material, surface stoniness, slope, and drainage) and the quality of the material (moist consistence, texture, and coarse fragments).

It is assumed that sites from which topsoil is taken must be restored and so the characteristics of the remaining soil material must be adequate for revegetation and erosion control. If restoration is expected to be a problem, the rating is downgraded to poor or unsuitable, depending upon the severity.

Table 20 presents the soil criteria and classes used in making this interpretation.

### Gravel

Gravel is used in great quantities in many kinds of construction. The location of significant sources of this material near construction sites can greatly reduce hauling costs.

The soil suitability is rated according to the ease of excavation, which is influenced by the depth of the material, surface stoniness, slope, and soil drainage. Gravel quality is evaluated by considering subsoil texture, coarse fragment content and gravel hardness.

The ratings are not intended for a specific kind of use but are merely guidelines to help users locate probable sources.

Size, shape, and location of a potential source are not considered as rating criteria.

Table 21 presents the soil criteria and classes used in making this interpretation.

## Roadfill

Roadfill is soil material that is excavated from its original position and used as construction material for road foundations and embankments. To minimize hauling costs, much fill is excavated from local soils if it is of acceptable quality.

The suitability of a soil as a source of road fill is dependent upon how easily it can be excavated and how well it performs under use. Soil properties that influence the ease of excavation are slope, surface stoniness, soil drainage, and rockiness. How well the soil performs under use is indicated by the Unified and AASHO classifications, the susceptibility to frost-action, and the shrink-swell potential. All soils in Colchester County have low or insignificant shrink-swell potential.

Table 22 presents the soil criteria and classes used in making this interpretation.

Table 23 presents, for each map unit, the complete interpretations for soil as a source of material.

Table 20. Soil suitability as a source of topsoil

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Moist consistence[2] (c) | very friable, friable | loose, firm | very firm | --- |
| Texture[2] (s) | L,SiL,SL | CL,SiCL | S,LS | organic |
| Thickness of material, cm (d) | >40 | 40-20 | 20-10 | <10 |
| Coarse fragments,[2] % by volume (f) | <3 | 3-15 | 15-40 | >40 |
| Stoniness[2] (p) | 0 | 1 | 2-3 | 4-5 |
| Slope, % (t) | <5 | 5-9 | 9-15 | >15 |
| Drainage[2] (w) | R,W,MW,I | P | VP | --- |

Sources: Wang and Rees 1983, United States Department of Agriculture 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

Table 21. Soil suitability as a source for gravel

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Subsoil texture[2] (s) | VGS<br>gravel | GS,GLS<br>VGLS | VGSL,GSL | all other textures |
| Coarse fragments,[2] % by volume (f) | | | | |
| - gravel | >60 | 40-60 | 20-40 | <20 |
| - cobbles | <5 | 5-15 | 15-40 | >40 |
| Stoniness[2] (p) | 0-3 | 4,5 | --- | --- |
| Drainage[2] (w) | R,W,MW,I | P | VP | --- |
| Gravel hardness (g) | hard[3] | soft[4] | --- | --- |

Sources: Wang and Rees 1983, United States Department of Agriculture 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] Day 1983.

[3] Within the survey area, deposits specified as being of hard gravel consist mainly of igneous and metamorphic rocks such as granite, quartzite, diorite, basalt, rhyolite, schist, and rocks from the Horton Group.

[4] Deposits specified as soft gravel consist mainly of shale, mudstone, and siltstone of late Carboniferous origin.

Table 22. Soil suitability as a source for roadfill

| Soil factors[1] (limitation symbol) | Degree of suitability | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Unsuitable |
| Engineering classes[3]: (b) | | | | |
| - Unified class | GW,GP,SW,SP<br>(GM,GC,<br>SM,SC)[2] | CL (PI<15%)[3]<br>ML,OL,MH<br>CH,OH | CL (PI>15%) | Pt |
| - AASHO class | A-1,A-2,A-3 | A-4,A-5 | A-6,A-7 | --- |
| Susceptibility to frost action (h) | GW,GP,SW,SP | GM,GC,SM<br>SC,CL | ML,MH | --- |
| Slope,[4] % (t) | <15 | 15-30 | 30-45 | >45 |
| Stoniness[4] (p) | 0-3 | 4 | 5 | --- |
| Rockiness[4] (r) | 0-1 | 2 | 3-4 | 5 |
| Drainage[4] (w) | R,W,MW | I | P,VP | --- |

Sources: Wang and Rees 1983, United States Department of Agriculture, 1976.

[1] Soil factor class codes are defined in Appendix 3.

[2] The suitability rating is downgraded to fair if the content of fine soil (material passing No. 200 sieve) is more than 30%.

[3] See Appendix 2 for the description of the Unified and AASHO Engineering Classification System.

[4] Day 1983.

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Ac4/A | Fcs>Px | Ufs | Ph |
| Ac4/B | Fcs>Px | Ufs | Ph |
| Ac5/A | Px | Ufs | Ph |
| Ac5/B | Px | Ufs | Ux |
| Ct/A | Us | Us | Ub |
| Cd1/C | Pfp | Ps | Fhr |
| Cd1/D | Pfp | Ps | Fhr |
| Cd1/E | Ux | Ps | Fhr |
| Cd1/F | Ut | Ps | Px |
| Cd1/G | Ut | Ps | Pt |
| Cd2/C | Pfp | Ps | Fhr>Fhw |
| Cd2/D | Pfp | Ps | Fhr>Fhw |
| Cd2/E | Ux | Ps | Fhr>Fhw |
| Cd2/F | Ut | Ps | Px |
| Cd2/G | Ut | Ps | Pt |
| Cd3/B | Pfp | Ps | Fhw |
| Cd3/C | Pfp | Ps | Fhw |
| Cd3/D | Pfp | Ps | Fhw |
| Cd3/E | Ux | Ps | Fhw |
| Cd3/F | Ut | Ps | Px |
| Cd4/B | Pfp | Ps | Fhw>Pw |
| Cd4/C | Pfp | Ps | Fhw>Pw |
| Cd4/D | Pfp | Ps | Fhw>Pw |
| Cd4/E | Ux | Ps | Fhw>Pw |
| Cd5/C | Pfp | Ps | Pw |
| Cd5/D | Pfp | Ps | Pw |
| Cd5/E | Ux | Ps | Pw |
| Cd6/C | Pfp>Us | Ps>Us | Pw>Ub |
| Cd6/D | Pfp>Us | Ps>Us | Pw>Ub |
| Cb | Pfs | *NR | NR |
| Cm1/A | G | G | G |
| Cm1/B | G | G | G |
| Cm1/C | G | G | G |
| Cm2/B | G | G | Fw |
| Cm3/B | G | G | Fw |
| Cm3/C | G | G | Fw |
| Cm3/D | Ft | G | Fw |
| Cm4/B | G>Fw | G>Fw | Fw>Pw |
| Cm4/C | G>Fw | G>Fw | Fw>Pw |
| Cm4/D | Ft>Ftw | G>Fw | Fw>Pw |
| Cm5/A | Fw | Fw | Pw |
| Cm5/B | Fw | Fw | Pw |
| Cm5/C | Fw | Fw | Pw |
| Cm6/A | Fw>Us | Fw>Us | Pw>Ub |
| Cm6/B | Fw>Us | Fw>Us | Pw>Ub |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Cm6/C | Fw>Us | Fw>Us | Pw>Ub |
| Dg3/D | Pfp | Us | Ph |
| Dg3/E | Ux | Us | Ph |
| Dg3/F | Ut | Us | Ph |
| Dg4/C | Pfp | Us | Ph>Phw |
| Dg4/D | Pfp | Us | Ph>Phw |
| Dg4/E | Ux | Us | Ph>Phw |
| Dg4/F | Ut | Us | Ph>Phw |
| Dg5/B | Pfp | Us | Phw |
| Dg5/C | Pfp | Us | Phw |
| Dg5/D | Pfp | Us | Phw |
| Fs4/B | Fcs>Px | Ufs | Ph>Phw |
| Fs4/C | Fcs>Px | Ufs | Ph>Phw |
| Fs5/B | Px | Ufs | Phw |
| Fs5/C | Px | Ufs | Phw |
| Fs6/B | Px>Us | Ufs | Phw>Ub |
| Fo1/A | Pfp | Pfs | Fh |
| Fo1/C | Pfp | Pfs | Fh |
| Fo1/G | Ut | Pfs | Pt |
| Fo2/D | Pfp | Pfs | Fh>Fhw |
| Fo2/E | Ux | Pfs | Fh>Fhw |
| Fo2/F | Ut | Pfs | Fht>Px |
| Fo2/G | Ut | Pfs | Pt |
| Fo3/C | Pfp | Pfs | Fhw |
| Fo3/D | Pfp | Pfs | Fhw |
| Fo3/E | Ux | Pfs | Fhw |
| Fo4/C | Pfp | Pfs | Fhw>Pw |
| Fo4/D | Pfp | Pfs | Fhw>Pw |
| Fo5/C | Pfp | Pfs | Pw |
| Fo5/D | Pfp | Pfs | Pw |
| Hd1/E | Ux | Pfs | Fbh |
| Hd1/F | Ut | Pfs | Px |
| Hd2/D | Pfp | Pfs | Fbh>Px |
| Hd2/E | Ux | Pfs | Fbh>Px |
| Hd3/C | Pfp | Pfs | Px |
| Hd3/D | Pfp | Pfs | Px |
| Hd4/C | Pfp | Pfs | Px>Pw |
| Hd4/D | Pfp | Pfs | Px>Pw |
| Hd5/C | Pfp | Pfs | Pw |
| Hd5/D | Pfp | Pfs | Pw |
| He1/B | Pf | G | G |
| He1/C | Pf | G | G |
| He1/D | Pf | G | G |
| He1/E | Pft | G | G |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| He1/F | Ut | G | G |
| He1/G | Ut | G | G |
| He2/B | Pf | G | G>Fw |
| He2/C | Pf | G | G>Fw |
| He2/D | Pf | G | G>Fw |
| He2/E | Pft | G | G>Fw |
| He2/F | Ut | G | Ft>Ftw |
| He2/G | Ut | G | Pt |
| He3/B | Pf | G | Fw |
| He3/C | Pf | G | Fw |
| He3/D | Pf | G | Fw |
| He3/E | Pft | G | Fw |
| He4/B | Pf | G>Fw | Fw>Pw |
| He4/C | Pf | G>Fw | Fw>Pw |
| He4/D | Pf | G>Fw | Fw>Pw |
| He5/B | Pf | Fw | Pw |
| He5/C | Pf | Fw | Pw |
| He5/D | Pf | Fw | Pw |
| He6/B | Pf>Us | Fw>Us | Pw>Ub |
| He6/C | Pf>Us | Fw>Us | Pw>Ub |
| He7/C | Pf | G>Fw | G>Pw |
| He7/D | Pf | G>Fw | G>Pw |
| Kh1/D | Uf | Ps | Fh |
| Kh1/F | Uft | Ps | Fht |
| Kh2/D | Uf | Ps | Fh>Fhw |
| Kh2/E | Uf | Ps | Fh>Fhw |
| Kh2/F | Uft | Ps | Fht>Px |
| Kh3/D | Uf | Ps | Fhw |
| Kh3/E | Uf | Ps | Fhw |
| Kh4/E | Uf | Ps | Fhw>Pw |
| Kh6/C | Uf>Us | Ps>Us | Pw>Ub |
| Mi2/C | Pp | Us | Px>Fbh |
| Mi2/D | Pp | Us | Px>Fbh |
| Mi2/E | Ppt | Us | Px>Fbh |
| Mi3/C | Pp | Us | Px |
| Mi3/D | Pp | Us | Px |
| Mi3/E | Ppt | Us | Px |
| Mi4/B | Pp | Us | Px>Pw |
| Mi4/C | Pp | Us | Px>Pw |
| Mi4/D | Pp | Us | Px>Pw |
| Mi4/E | Ppt | Us | Px>Pw |
| Mi4/F | Ut | Us | Px>Pw |
| Mi5/B | Pp | Us | Pw |
| Mi5/C | Pp | Us | Pw |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Mi5/D | Pp | Us | Pw |
| Mi6/B | Pp>Us | Us | Pw>Ub |
| Mi6/C | Pp>Us | Us | Pw>Ub |
| Pp2/C | Pfp | Pfs | G>Fw |
| Pp2/D | Pfp | Pfs | G>Fw |
| Pp2/E | Ux | Pfs | G>Fw |
| Pp2/F | Ut | Pfs | Ft>Ftw |
| Pp2/G | Ut | Pfs | Pt |
| Pp3/C | Pfp | Pfs | Fw |
| Pp3/D | Pfp | Pfs | Fw |
| Pp3/E | Ux | Pfs | Fw |
| Pp4/C | Pfp | Pfs | Fw>Pw |
| Pp4/D | Pfp | Pfs | Fw>Pw |
| Pp5/C | Pfp | Pfs | Pw |
| Ph1/C | Up | Ps | Px |
| Ph1/D | Up | Ps | Px |
| Ph2/C | Up | Ps | Px |
| Ph2/D | Up | Ps | Px |
| Ph2/E | Up | Ps | Px |
| Ph3/C | Up | Ps | Px |
| Ph3/D | Up | Ps | Px |
| Ph4/C | Up | Ps | Px>Pw |
| Ph4/D | Up | Ps | Px>Pw |
| Ph4/E | Up | Ps | Px>Pw |
| Ph5/B | Up | Ps | Pw |
| Ph5/C | Up | Ps | Pw |
| Ph5/D | Up | Ps | Pw |
| Ph6/C | Up>Us | Ps>Us | Pw>Ub |
| Ph7/C | Up | Ps | Px>Pw |
| Pw1/A | Ffp | Ufs | Fbh |
| Pw1/B | Ffp | Ufs | Fbh |
| Pw1/C | Ffp | Ufs | Fbh |
| Pw1/D | Px | Ufs | Fbh |
| Pw1/E | Pt | Ufs | Fbh |
| Pw2/C | Ffp | Ufs | Fbh>Px |
| Pw2/D | Px | Ufs | Fbh>Px |
| Pw3/B | Ffp | Ufs | Px |
| Pw3/C | Ffp | Ufs | Px |
| Pw3/D | Px | Ufs | Px |
| Pw3/E | Pt | Ufs | Px |
| Pw4/C | Ffp>Px | Ufs | Px>Pw |
| Pw4/D | Px | Ufs | Px>Pw |
| Pw5/B | Px | Ufs | Pw |
| Pw5/C | Px | Ufs | Pw |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Pw5/D | Px | Ufs | Pw |
| Pw6/B | Px>Us | Us | Pw>Ub |
| Pw6/C | Px>Us | Us | Pw>Ub |
| Qu2/D | Px | Ufs | Px>Fbh |
| Qu3/B | Px | Ufs | Px |
| Qu3/C | Px | Ufs | Px |
| Qu3/D | Px | Ufs | Px |
| Qu3/E | Pt | Ufs | Px |
| Qu3/F | Ut | Ufs | Px |
| Qu3/G | Ut | Ufs | Pt |
| Qu4/B | Px | Ufs | Px>Pw |
| Qu4/C | Px | Ufs | Px>Pw |
| Qu4/D | Px | Ufs | Px>Pw |
| Qu4/E | Pt | Ufs | Px>Pw |
| Qu5/B | Px | Ufs | Pw |
| Qu5/C | Px | Ufs | Pw |
| Qu5/D | Px | Ufs | Pw |
| Qu5/E | Pt | Ufs | Pw |
| Qu6/B | Px>Us | Us | Pw>Ub |
| Qu6/C | Px>Us | Us | Pw>Ub |
| Qu6/D | Px>Us | Us | Pw>Ub |
| Qu6/E | Px>Us | Us | Pw>Ub |
| Ra2/C | Pfp | Us | Fh>Fhw |
| Ra2/D | Pfp | Us | Fh>Fhw |
| Ra2/E | Ux | Us | Fh>Fhw |
| Ra2/F | Ut | Us | Fht>Px |
| Ra3/C | Pfp | Us | Fhw |
| Ra3/D | Pfp | Us | Fhw |
| Ra3/E | Ux | Us | Fhw |
| Ra4/C | Pfp | Us | Fhw>Pw |
| Ra4/D | Pfp | Us | Fhw>Pw |
| Ra5/B | Pfp | Us | Fhw>Pw |
| Ra5/C | Pfp | Us | Pw |
| Ra6/B | Pfp>Us | Us | Pw |
| Ra6/C | Pfp>Us | Us | Pw>Ub |
| Ra6/D | Pfp>Us | Us | Pw>Ub |
| Ry1/C | Uf | Us | Fhr |
| Ry1/D | Uf | Us | Fhr |
| Ry1/F | Uft | Us | Px |
| Ry1/G | Uft | Us | Pt |
| Ry2/D | Uf | Us | Fhr>Px |
| Ry4/C | Uf | Us | Fbw>Pw |
| SM | Pw | Ufs | Phw |
| Se3/B | G | Ufs | Ph |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Se3/C | G | Ufs | Ph |
| Se4/A | G>Fw | Ufs | Ph>Phw |
| Se4/B | G>Fw | Ufs | Ph>Phw |
| Se4/C | G>Fw | Ufs | Ph>Phw |
| Se5/A | Fw | Ufs | Phw |
| Se5/B | Fw | Ufs | Phw |
| Se6/A | Fw>Us | Us | Phw>Ub |
| Se6/B | Fw>Us | Us | Phw>Ub |
| Tm1/C | Pfp | Pfs | Fh |
| Tm1/D | Pfp | Pfs | Fh |
| Tm1/E | Ux | Pfs | Fh |
| Tm2/C | Pfp | Pfs | Fh>Fhw |
| Tm2/D | Pfp | Pfs | Fh>Fhw |
| Tm2/E | Ux | Pfs | Fh>Fhw |
| Tm2/F | Ut | Pfs | Fht>Pt |
| Tm3/C | Pfp | Pfs | Fhw |
| Tm3/D | Pfp | Pfs | Fhw |
| Tm3/E | Ux | Pfs | Fhw |
| Tm3/F | Ut | Pfs | Px |
| Tm4/B | Pfp | Pfs | Fhw>Pw |
| Tm4/C | Pfp | Pfs | Fhw>Pw |
| Tm5/C | Pfp | Pfs | Pw |
| Tm5/D | Pfp | Pfs | Pw |
| Tm5/E | Px | Pfs | Pw |
| Tm6/B | Pfp>Us | Pfs>Us | Pw>Ub |
| Tm6/C | Pfp>Us | Pfs>Us | Pw>Ub |
| Tm6/D | Pfp>Us | Pfs>Us | Pw>Ub |
| Tu1/C | G | Ufs | Fh |
| Tu1/D | Ft | Ufs | Fh |
| Tu1/E | Pt | Ufs | Fh |
| Tu2/C | G | Ufs | Fh>Fhw |
| Tu2/D | Ft | Ufs | Fh>Fhw |
| Tu2/G | Ut | Ufs | Pt |
| Tu3/B | G | Ufs | Fhw |
| Tu3/C | G | Ufs | Fhw |
| Tu3/D | Ft | Ufs | Fhw |
| Tu3/E | Pt | Ufs | Fhw |
| Tu4/C | G>Fw | Ufs | Fhw>Pw |
| Tu4/D | Ft>Ftw | Ufs | Fhw>Pw |
| Tu5/C | Fw | Ufs | Pw |
| Tu5/D | Ftw | Ufs | Pw |
| Tu5/E | Pt | Ufs | Pw |
| Wb1/C | Pfp | Ps | Fh |
| Wb1/D | Pfp | Ps | Fh |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (continued)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Wb1/E | Ux | Ps | Fh |
| Wb1/F | Ut | Ps | Fht |
| Wb2/C | Pfp | Ps | Fh>Fhw |
| Wb2/D | Pfp | Ps | Fh>Fhw |
| Wb2/E | Ux | Ps | Fh>Fhw |
| Wb2/F | Ut | Ps | Fht>Px |
| Wb3/C | Pfp | Ps | Fhw |
| Wb3/D | Pfp | Ps | Fhw |
| Wb4/E | Ux | Ps | Fhw>Pw |
| Wo1/C | Pfp | Us | Fh |
| Wo2/C | Pfp | Us | Fh |
| Wo2/D | Pfp | Us | Fbh>Px |
| Wo2/E | Ux | Us | Fbh>Px |
| Wo2/F | Ut | Us | Px |
| Wo3/C | Pfp | Us | Px |
| Wo3/D | Pfp | Us | Px |
| Wo3/E | Ux | Us | Px |
| Wo4/C | Pfp | Us | Px>Pw |
| Wo4/D | Pfp | Us | Px>Pw |
| Wo5/B | Pfp | Us | Pw |
| Wo5/C | Pfp | Us | Pw |
| Wo5/D | Pfp | Us | Pw |
| Wo6/B | Pfp>Us | Us | Pw>Ub |
| Wo6/C | Pfp>Us | Us | Pw>Ub |
| Wd1/B | Ff | Ufs | Fbh |
| Wd1/C | Ff | Ufs | Fbh |
| Wd1/D | Fft | Ufs | Fbh |
| Wd1/E | Pt | Ufs | Fbh |
| Wd2/C | Ff | Ufs | Fbh>Px |
| Wd2/D | Ff | Ufs | Fbh>Px |
| Wd2/E | Pt | Ufs | Fbh>Px |
| Wd3/B | Ff | Ufs | Px |
| Wd3/C | Ff | Ufs | Px |
| Wd3/D | Fft | Ufs | Px |
| Wd3/E | Pt | Ufs | Px |
| Wd4/C | Ff>Ffw | Ufs | Px>Pw |
| Wd4/D | Fft>Px | Ufs | Px>Pw |
| Wd4/E | Pt | Ufs | Px>Pw |
| Wd5/B | Ffw | Ufs | Pw |
| Wd5/C | Ffw | Ufs | Pw |
| Wd6/C | Ffw>Us | Us | Pw>Ub |
| Wd6/E | Pt>Us | Us | Pw>Ub |
| Wn1/C | Ufp | Ps | Px |
| Wn1/D | Ufp | Ps | Px |

(continued)

Table 23. SOIL INTERPRETATIONS FOR SOURCE OF MATERIALS (concluded)

| Map symbol | Topsoil | Gravel | Roadfill |
|---|---|---|---|
| Wn1/E | Ufp | Ps | Px |
| Wn1/F | Ufp | Ps | Px |
| Wn1/G | Ufp | Ps | Px |
| Wn2/C | Ufp | Ps | Px |
| Wn2/D | Ufp | Ps | Px |
| Wn2/E | Ufp | Ps | Px |
| Wn2/F | Ufp | Ps | Px |
| Wn2/G | Ufp | Ps | Pt |
| Wn3/C | Ufp | Ps | Px |
| Wn3/D | Ufp | Ps | Px |
| Wn3/E | Ufp | Ps | Px |
| Wn3/F | Ufp | Ps | Px |
| Wn4/B | Ufp | Ps | Px>Pw |
| Wn4/C | Ufp | Ps | Px>Pw |
| Wn4/D | Ufp | Ps | Px>Pw |
| Wn5/C | Ufp | Ps | Pw |
| Wn5/D | Ufp | Ps | Pw |
| Wn5/E | Ufp | Ps | Pw |
| Wn6/C | Ufp>Us | Ps>Us | Pw>Ub |
| Wn6/D | Ufp>Us | Ps>Us | Pw>Ub |

*NR - not rated

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# APPENDIX 1

## LOCAL AND BOTANICAL NAMES OF PLANT SPECIES MENTIONED IN THIS REPORT
(after Roland and Smith 1969)

| Local name | Botanical name |
|---|---|
| **Trees** | |
| alder, speckled | *Alnus rugosa* (DuRoi) Spreng |
| aspen, trembling | *Populus tremuloides* Michx. |
| beech, American | *Fagus grandifolia* Ehrh. |
| birch, wire | *Betula populifolia* Marsh. |
| birch, white | *Betula papyrifera* Marsh. |
| birch, yellow | *Betula alleghaniensis* Britt. |
| fir, balsam | *Abies balsamea* (L.) Mill. |
| hemlock, eastern | *Tsuga canadensis* (L.) Carr |
| maple, mountain | *Acer spicatum* Lam. |
| maple, red | *Acer rubrum* L. |
| maple, sugar | *Acer saccharum* Marsh. |
| mountain-ash | *Sorbus americana* Marsh. |
| pine, eastern white | *Pinus Strobus* L. |
| pine, jack | *Pinus Banksiana* Lamb. |
| pine, red | *Pinus resinosa* Ait. |
| spruce, black | *Picea mariana* (Mill.) BSP. |
| spruce, red | *Picea rubens* Sarg. |
| spruce, white | *Picea glauca* (Moench) Voss. |
| tamarack | *Larix laricina* (DuRoi) K. Koch |
| **Other plants** | |
| blueberry | *Vaccinium* spp. |
| bunchberry | *Cornus canadensis* L. |
| cloudberry | *Rubus Chamaemorus* L. |
| club-moss, bristly | *Lycopodium annotinum* L. |
| club-moss, shining | *Lycopodium lucidulum* Michx. |
| foxberry | *Vaccinium Vitis-Idaea* L. |
| glasswort | *Salicornia europaea* L. |
| goldthread | *Coptis trifolia* (L.) Salisb. |
| hazelnut, beaked | *Corylus cornuta* Marsh. |
| hobblebush | *Viburnum alnifolium* Marsh. |
| Labrador-tea | *Ledum groenlandicum* Oeder. |
| miterwort | *Mitella nuda* L. |
| mosses, feather | *Pleurozium scheberi*<br>*Hylocomium splendens*<br>*Ptilium crista-castrensis* |
| mosses, sphagnum | *Sphagnum* spp. |
| raspberry, wild | *Rubus strigosus* Michx. |
| rhodora | *Rhododendron canadense* (L.) Torr. |

(continued)

## APPENDIX 1 (concluded)

| | |
|---|---|
| salt-grass | *Distichlis spicata* (L.)Greene |
| sand-spurrey | *Spergularia marina* (L.) Griseb. |
| sea-blite | *Suaeda maritima* (L.) Dumort. |
| sea-rocket | *Cakile edentula* (Bigel.) Hook. |
| sedge | *Carex* spp. |
| sheep-laurel | *Kalmia angustifolia* L. |
| sweet-fern | *Comptonia peregrina* (L.) Coult. |
| teaberry | *Gautheria procumbens* L. |
| witherod | *Viburnum cassinoides* L. |
| wood-fern | *Dryopteris spinulosa* (O.F. Muell.) Watt |
| wood-sorrel | *Oxalis montana* Raf. |

## APPENDIX 2

## PROFILE DESCRIPTIONS AND ANALYSES

Profile descriptions and analyses are given for each of the following:

Table 2-1. Imperfectly drained ACADIA SOIL
Table 2-2. Moderately well-drained COBEQUID SOIL
Table 2-3. Rapidly drained CUMBERLAND SOIL
Table 2-4. Imperfectly drained DILIGENCE SOIL
Table 2-5. Poorly drained FASH SOIL
Table 2-6. Moderately well-drained FOLLY SOIL
Table 2-7. Moderately well-drained HANSFORD SOIL
Table 2-8. Well-drained HEBERT SOIL
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Table 2-10. Moderately-well drained MILLBROOK SOIL
Table 2-11. Well-drained PERCH LAKE SOIL
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Table 2-13. Imperfectly drained PUGWASH SOIL
Table 2-14. Imperfectly drained QUEENS SOIL
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Table 2-17. Poorly drained STEWIACKE SOIL
Table 2-18. Moderately-well drained THOM SOIL
Table 2-19. Well-drained TRURO SOIL
Table 2-20. Well-drained WESTBROOK SOIL
Table 2-21. Imperfectly drained WOODBOURNE SOIL
Table 2-22. Moderately-well drained WOODVILLE SOIL
Table 2-23. Well-drained WYVERN SOIL

Table 2-1. Imperfectly drained ACADIA SOIL

Location: UTM 20 T ME 7063 9900
NTS Map: Shubenacadie 11E/3
Slope: 0%

Landform and parent material: level, coarse loamy to coarse silty, dyked, marine sediments
Present land use: forage production
Stoniness: nonstony
Rockiness: nonrocky
Classification (1987): Rego Gleysol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| Apgj | 0-1 | dark brown (7.5YR 3/4m) | silt loam | weak to moderate | fine | subangular blocky | friable | common fine and medium faint Fe | 0 | abundant very fine |
| Apg | 15-26 | dark reddish brown (5YR 3/4m) | loam | weak | fine to medium | subangular blocky | friable | many fine and medium prominent Fe | 0 | plentiful very fine |
| Cg1 | 26-46 | dark reddish brown (5YR 3/4m) | very fine sandy loam | very weak | fine to medium | subangular blocky | friable | common fine and medium distinct Fe | 0 | plentiful very fine |
| Cg2 | 46-53 | dark reddish brown (5YR 3/2.5m) | silt loam | very weak | coarse | platy | friable | many, fine prominent Fe | 0 | few very fine |
| Cg3 | 53-85 | dark reddish brown (5YR 3/4m) | silt loam | weak | medium | subangular blocky | firm | common, fine and medium prominent Fe | 0 | few very fine |
| Cg4 | 85-100 | dark reddish gray (5YR 4/2m) | silt loam | weak | medium to coarse | subangular blocky | firm | common, fine prominent Fe | 0 | few very fine |

Table 2-1. Imperfectly drained ACADIA SOIL (continued)

ANALYSES

| Horizon | Depth | pH | | Organic C | Pyrophosphate | | Exchangeable cations (meq/100 g) | | | | | | Particle size distribution (%) | | | | | | | | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (cm) | $H_2O$ | $CaCl_2$ | (%) | Fe | Al | CEC | Al | Ca | Mg | K | Na | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | |
| Apgj | 0-15 | 5.8 | 4.9 | 1.94 | 0.28 | 0.07 | 28.4 | - | 4.76 | 3.92 | 0.19 | 0.27 | 0.2 | 0 2 | 0.2 | 4.4 | 21.9 | 26.8 | 55.7 | 18.0 | 0.44 |
| Apg | 15-26 | 5.8 | 5.0 | 1.06 | 0.15 | 0.02 | 19.7 | - | 4.10 | 2.70 | 0.11 | 0.55 | 0.0 | 0.2 | 0.2 | 6.1 | 40.5 | 47.0 | 45.5 | 7.5 | 0.60 |
| Cg1 | 26-46 | 6.1 | 5.3 | 0.36 | 0.06 | 0.00 | 13.0 | - | 3.54 | 2.73 | 0.10 | 1.08 | 0.1 | 0.0 | 0.0 | 3.8 | 45.0 | 48.9 | 44.4 | 6.7 | 0.70 |
| Cg2 | 46-53 | 6.2 | 5.5 | 0.92 | 0.10 | 0.00 | 19.0 | - | 4.44 | 3.39 | 0.12 | 1.51 | 0.1 | 0.1 | 0.1 | 1.9 | 40.6 | 42.8 | 50.5 | 6.9 | 0.64 |
| Cg3 | 53-85 | 6.5 | 6.0 | 0.37 | 0.11 | 0.01 | 18.0 | - | 3.94 | 4.38 | 0.25 | 2.07 | 0.0 | 0.0 | 0.0 | 0.6 | 19.3 | 19.9 | 66.8 | 13.2 | 0.63 |
| Cg4 | 85-100 | 6.8 | 6.3 | 0.46 | 0.10 | 0.01 | 18.7 | - | 3.60 | 4.87 | 0.41 | 3.47 | 0.0 | 0.0 | 0.0 | 0.5 | 13.6 | 14.1 | 71.7 | 14.2 | 0.60 |

| Horizon | (%) passing sieve | | | | Atterburg limits | | Classification | | Bulk density ($g/cm^3$) | Hydraulic conductivity (cm/h) | Moisture retention (% vol.) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | (-kPa) | | | |
| | No. 4 | No. 10 | No. 40 | No. 200 | Liquid | Plastic | Unified | AASHO | | | 10 | 30 | 300 | 1500 |
| Apgj | 100 | 100 | 98.1 | 81.2 | 38.4 | 30.3 | ML | A-4 | 1.3 | 0.9 | 33.1 | 18.0 | 11.4 | 10.0 |
| Apg | 100 | 100 | 99.4 | 74.4 | 33.3 | 28.7 | ML | A-4 | - | - | - | - | - | - |
| Cg1 | 100 | 100 | 99.4 | 82.9 | 28.0 | 24.4 | ML | A-4 | 1.5 | 1.0 | 31.6 | 13.1 | 7.6 | 7.2 |
| Cg2 | 100 | 100 | 99.0 | 82.4 | 34.6 | 27.6 | ML | A-4 | - | - | - | - | - | - |
| Cg3 | 100 | 100 | 99.9 | 96.9 | 30.1 | 24.2 | ML | A-4 | 1.5 | 0.6 | 32.6 | 16.4 | 9.8 | 8.7 |
| Cg4 | 100 | 100 | 99.7 | 98.4 | 31.3 | 23.7 | ML | A-4 | 1.6 | - | - | - | - | - |

Table 2-2. Moderately-well drained COBEQUID SOIL

Location: UTM 20 T MF 414364
NTS Map: 11E/5W
Slope and aspect: 14%; westsouthwest
Elevation: 210 m

Parent material: coarse loamy, till
Classification (1978): Orthic Ferro-Humic Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| LFH | 10-0 | dark reddish brown (5YR 2.5/2m) | ...moderately decomposed forest litter... |  |  |  |  |  |  | abundant |
| Ae | 0-3 | gray (10YR 6/1m) | gravelly loam | moderate | medium | platy | very friable | none | 25 | abundant |
| Bhf | 3-30 | strong brown (7.5YR 4/4m) | gravelly loam | moderate | medium | granular | very friable | none | 20 | plentiful |
| Bf1 | 30-43 | dark brown (7.5YR 4/4m) | gravelly sandy loam | weak | medium | granular | very friable | none | 25 | few |
| Bf2 | 43-56 | dark reddish gray (5YR 3/4m) | gravelly sandy loam | weak | coarse | platy | very friable | none | 25 | few |
| BC | 56-69 | dark reddish gray (5YR 4/2m) | gravelly sandy loam | weak | coarse | platy | very friable | none | 25 | few |
| C | 69-100 | dark yellowish brown (10YR 3/4m) | gravelly sandy loam | medium | coarse | platy | friable | none | 25 | few |

Table 2-2. Moderately-well drained COBEQUID SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 10-0 | 5.7 | 4.1 | 1.0 | 0.1 | 0.1 | 0.2 | 0.0 |
| Ae | 0-3 | 0.6 | 0.4 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 |
| Bhf | 3-30 | 0.3 | 0.1 | 0.1 | 0.6 | 0.7 | 1.3 | 1.2 |
| Bf1 | 30-43 | 0.6 | 0.2 | 0.1 | 0.3 | 0.5 | 1.1 | 0.8 |
| Bf2 | 43-56 | 0.8 | 0.2 | 0.1 | 0.5 | 1.0 | 1.2 | 1.8 |
| BC | 56-69 | 0.5 | 0.2 | 0.1 | 0.3 | 0.6 | 0.7 | 0.8 |
| C | 69-100 | 0.4 | 0.2 | 0.1 | 0.2 | 0.4 | 0.5 | 0.6 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LFH | 3.6 | 3.3 | - | - | - | - | - | - | - | - |
| Ae | 3.4 | 3.2 | 7.2 | 5.5 | 3.9 | 12.2 | 19.4 | 48.2 | 43.0 | 8.8 |
| Bhf | 4.6 | 4.5 | 8.9 | 7.8 | 4.6 | 13.6 | 15.7 | 50.6 | 39.4 | 10.0 |
| Bf1 | 4.8 | 4.5 | 11.7 | 9.3 | 5.3 | 14.6 | 15.0 | 55.9 | 35.7 | 8.4 |
| Bf2 | 4.6 | 4.3 | 8.8 | 7.1 | 4.6 | 14.0 | 19.8 | 54.3 | 35.3 | 10.4 |
| BC | 4.8 | 4.4 | 10.8 | 8.6 | 5.0 | 13.6 | 19.1 | 57.1 | 36.3 | 6.6 |
| C | 4.7 | 4.4 | 12.2 | 9.8 | 4.9 | 12.7 | 12.9 | 52.5 | 42.4 | 5.1 |

Table 2-3. Rapidly drained CUMBERLAND SOIL

Slope: 0.5%
Site Position: level

Landform and parent material: sandy skeletal, active, floodplain
Present land use: unproductive woodland
Stoniness: nonstony
Rockiness: nonrocky
Classification (1978): Cumulic Regosol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| Ah | 0-30 | dark brown (7.5YR 4/4m) | loam | moderate | fine to medium | subangular blocky | friable | none | 1 | plentiful |
| C1 | 30-54 | dark yellowish brown (10YR 3/4d) | gravelly sand | structureless |  | single grain | friable | none | 40 | plentiful |
| Ahb | 54-59 | dark yellowish brown (10YR 3.5/4d) | loamy sand | weak | fine | subangular blocky | very friable | none | 0 | plentiful |
| C2 | 59-100 | dark yellowish brown (10YR 3/4m) | very gravelly sand | structureless |  | single grain | loose | none | 50 | plentiful |

Table 2-3. Rapidly drained CUMBERLAND SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Total N (%) | C:N ratio | Exchangeable cations (meq/100 g soil) | | | | | Base sat. (%) | Pyrophosphate | | Dithionite | | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | Al | K | CEC | | Fe (%) | Al (%) | Fe (%) | Al (%) | Mn (%) | Fe (%) | Al (%) |
| Ah | 0-30 | 2.14 | 0.17 | 12.6 | 4.41 | 0.70 | 0 | 0.15 | 5.26 | 100 | 0.28 | 0.10 | 1.06 | 0.13 | 0.088 | 0.42 | 0.14 |
| C1 | 30-54 | 0.21 | 0.02 | 10.5 | 1.24 | 0.25 | 0 | 0.07 | 1.56 | 100 | 0.05 | 0.03 | 0.76 | 0.08 | 0.037 | 0.22 | 0.07 |
| Ahb | 54-59 | 0.88 | 0.07 | 12.6 | 2.41 | 0.48 | 0 | 0.38 | 3.27 | 100 | 0.15 | 0.05 | 0.80 | 0.10 | 0.046 | 0.29 | 0.90 |
| C2 | 59-100 | 0.24 | 0.02 | 12.0 | 1.17 | 0.27 | 0 | 0.07 | 1.51 | 100 | 0.05 | 0.04 | 0.82 | 0.09 | 0.045 | 0.27 | 0.08 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density (g/cm$^3$) | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | | |
| Ah | 5.7 | 4.8 | 3.9 | 5.6 | 13.8 | 5.9 | 7.3 | 12.8 | 45.4 | 35.9 | 18.7 | 1 | 1.2 | 3.4 | 0.25 |
| C1 | 5.4 | 4.8 | 0.4 | 26.3 | 35.6 | 20.3 | 8.2 | 1.2 | 91.6 | 2.8 | 5.6 | 55 | - | - | 0.08 |
| Ahb | 5.4 | 4.7 | 1.6 | 3.7 | 14.4 | 33.7 | 26.6 | 5.0 | 83.4 | 8.1 | 8.5 | 0 | - | - | 0.14 |
| C2 | 5.7 | 4.9 | 0.4 | 36.3 | 36.9 | 12.7 | 4.7 | 1.0 | 91.6 | 2.4 | 6.0 | 61 | - | - | 0.07 |

Table 2-4. Imperfectly drained DILIGENCE SOIL

Slope and aspect: 7%; southeast
Site position: upper slope

Landform and parent material: hummocky, fine silty, till
Stoniness: moderately stony
Rockiness: nonrocky
Present land use: mixed wood forest
Classification (1978): Gleyed Podzolic Gray Luvisol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 3-0 | | ...poorly decomposed forest litter... | | | | | | | abundant |
| Ah | 0-8 | yellowish brown (10YR 5/4m) | silty clay loam | very weak | medium | subangular blocky | friable | none | 15 | abundant |
| Ae | 8-16 | light gray (10YR 7/2m) | silt loam | very weak | medium | subangular blocky | friable | none | 10 | abundant |
| Bf | 16-41 | yellowish brown (10YR 5/6m) | silt loam | weak | medium | subangular blocky | friable | none | 10 | plentiful |
| Btgj | 41-58 | light olive (2.5Y 5/4m) | gravelly silt loam | medium | coarse | angular blocky | firm | common medium distinct Fe | 30 | few |
| Cgj | 58-100 | light olive brown (2.5Y 5/4m) | gravelly silty clay loam | weak | very coarse | subangular blocky | firm | common fine faint Fe | 30 | none |

Table 2-4. Imperfectly drained DILIGENCE SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Total N (%) | C:N ratio | Exchangeable cations (meq/100 g soil) | | | | | Base sat. (%) | Pyrophosphate | | Dithionite | | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | Al | K | CEC | | Fe (%) | Al (%) | Fe (%) | Al (%) | Mn (%) | Fe (%) | Al (%) |
| LFH | 3-0 | 30.08 | 0.96 | 31.3 | 16.95 | 2.71 | 4.67 | 2.36 | 26.69 | 82.5 | 0.18 | 0.11 | 0.53 | 0.14 | 0.06 | 0.25 | 0.12 |
| Ah | 0-8 | 3.28 | 0.19 | 17.3 | 0.83 | 1.09 | 1.42 | 0.18 | 3.62 | 60.8 | 0.35 | 0.29 | 3.46 | 0.38 | 0.07 | 1.42 | 0.36 |
| Ae | 8-16 | 2.74 | 0.15 | 18.3 | 1.30 | 0.82 | 7.28 | 0.14 | 9.54 | 23.7 | 1.17 | 0.12 | 1.35 | 0.16 | 0.02 | 0.40 | 0.16 |
| Bf | 16-41 | 3.20 | 0.22 | 14.5 | 0.23 | 0.22 | 2.74 | 0.13 | 3.32 | 17.5 | 1.53 | 0.87 | 3.15 | 0.97 | 0.028 | 1.65 | 0.89 |
| Btgj | 41-58 | 0.46 | 0.07 | 6.6 | 0.24 | 0.17 | 4.06 | 0.07 | 4.54 | 10.6 | 0.31 | 0.26 | 1.29 | 0.31 | 0.015 | 0.42 | 0.34 |
| Cgj | 58-100 | 0.11 | 0.06 | 1.8 | 0.28 | 0.27 | 6.73 | 0.08 | 7.36 | 8.8 | 0.09 | 0.13 | 1.50 | 0.24 | 0.04 | 0.40 | 0.22 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density (g/cm$^3$) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | |
| LFH | 4.0 | 3.6 | 54.1 | - | - | - | - | - | - | - | - | - | - | - |
| Ah | 4.3 | 3.7 | 5.9 | 1.9 | 2.1 | 1.0 | 1.2 | 1.4 | 7.6 | 62.8 | 29.6 | 15 | 1.0 | 0.28 |
| Ae | 4.1 | 3.4 | 4.9 | 2.6 | 2.5 | 1.8 | 2.4 | 3.3 | 12.6 | 66.0 | 21.4 | 10 | 1.3 | 0.34 |
| Bf | 4.9 | 4.2 | 5.8 | 4.4 | 3.8 | 1.7 | 1.7 | 1.3 | 12.9 | 73.8 | 13.3 | 10 | 1.5 | 0.37 |
| Btgj | 5.0 | 4.3 | 0.8 | 0.0 | 8.4 | 4.2 | 3.8 | 1.6 | 18.0 | 56.0 | 26.0 | 30 | 1.7 | 0.41 |
| Cgj | 5.2 | 4.1 | 0.2 | 3.2 | 4.1 | 1.2 | 0.8 | 0.8 | 10.1 | 59.8 | 30.1 | 30 | 1.8 | 0.44 |

Table 2-5. Poorly drained FASH SOIL

Slope and aspect: 8%; southeast

Parent material : fine loamy, lacustrine sediments
Present land use: mixed wood forest
Classification (1978): Orthic Luvic Gleysol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| Apg | 0-18 | dark brown (7.5YR 3/2m) | silt loam | moderate | medium | platy | friable | common medium distinct Fe | 0 | abundant |
| Aeg | 18-25 | brown (7.5YR 5/2m) | silt loam | moderate | coarse | platy | friable | common medium distinct Fe | 0 | plentiful |
| Btg | 25-37 | brown (7.5YR 5/4m) | silt loam | moderate | fine | subangular blocky | friable to firm | few medium distinct Fe | 0 | few |
| Bt | 37-59 | dark reddish brown (5YR 3/4m) | silt loam | strong | medium | subangular blocky | firm | none | 0 | few |
| BC | 59-68 | dark reddish brown (5YR 3/4m) | silty clay loam | moderate | medium | platy | firm | none | 0 | none |
| Cg | 68-75 | dark reddish brown (5YR 3/4m) | silty clay loam | moderate | medium | platy | firm | common fine distinct Fe | 0 | none |
| Cgj | 75-100 | dark brown (7.5YR 4/4m) | silt loam | moderate | fine to medium | platy | firm | few medium faint Fe | 0 | none |

Table 2-5. Poorly drained FASH SOIL

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | |
|---|---|---|---|---|---|
| | | | Ca | Mg | K |
| Apg | 0-18 | 1.8 | 3.7 | 0.9 | 0.1 |
| Aeg | 18-25 | 0.2 | 1.7 | 0.8 | 0.1 |
| Btg | 25-37 | 0.4 | 0.6 | 0.3 | 0.1 |
| Bt | 37-59 | 0.2 | 0.6 | 0.4 | 0.1 |
| BC | 59-68 | 0.1 | 0.5 | 0.6 | 0.1 |
| Cg | 68-75 | 0.1 | 0.5 | 0.7 | 0.1 |
| Cgj | 75-100 | 0.0 | 0.4 | 0.4 | 0.1 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density ($g/cm^3$) | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | | |
| Apg | 5.4 | 4.8 | 3.1 | 3.1 | 4.7 | 1.3 | 3.4 | 15.6 | 28.1 | 54.0 | 17.9 | 0.0 | 1.3 | 20.8 | 0.46 |
| Aeg | 5.4 | 4.4 | 0.4 | 1.1 | 1.5 | 0.9 | 1.7 | 8.5 | 13.7 | 67.3 | 19.0 | 0.0 | 1.8 | 9.8 | 0.65 |
| Btg | 5.5 | 4.4 | 0.6 | 1.3 | 1.6 | 1.1 | 5.0 | 9.6 | 18.6 | 58.6 | 22.8 | 0.0 | 1.8 | 7.9 | 0.65 |
| Bt | 5.3 | 4.2 | 0.3 | 0.0 | 0.1 | 0.2 | 0.4 | 18.8 | 19.5 | 55.6 | 24.9 | 0.0 | 2.0 | 1.6 | 0.69 |
| BC | 5.1 | 4.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 7.9 | 8.0 | 64.4 | 27.6 | 0.0 | 2.0 | 0.0 | 0.61 |
| Cg | 5.1 | 4.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 12.2 | 12.3 | 57.1 | 30.6 | 0.0 | 1.9 | 0.0 | 0.63 |
| Cgj | 5.3 | 4.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 22.5 | 22.8 | 59.9 | 17.3 | 0.0 | 1.7 | 0.1 | 0.85 |

Table 2-6. Moderately-well drained FOLLY SOIL

Location: UTM 20T MF 692348
NTS Map: 11E/6W
Slope and aspect: 6%; southeast
Elevation : 75 m

Parent material : coarse loamy, till
Vegetation: fir, white birch and feather moss forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 5-0 | reddish black (10R 2/1m) | ...moss, needles, and semi-decomposed material... | | | | | | | abundant |
| Ae | 0-3 | pinkish gray (5YR 7/2m) | sandy loam | weak | medium | platy | very friable | none | 15 | few |
| Bf1 | 3-18 | yellowish red (5YR 5.5/8m) | sandy loam | moderate | medium | platy | very friable | none | 5 | plentiful |
| Bf2 | 18-46 | dark brown (7.5YR 4/4m) | gravelly sandy loam | weak | medium | granular | very friable | none | 25 | few |
| BC | 46-71 | reddish brown (5YR 5/4m) | gravelly sandy loam | weak | coarse | platy | friable | none | 20 | very few |
| C | 71-100 | dark brown (7.5YR 4/4m) | gravelly sandy loam | moderate | coarse | platy | friable to firm | none | 35 | none |

Table 2-6. Moderately-well drained FOLLY SOIL (continued)

ANALYSES

| Horizon | Depth | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | (cm) | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LH | 5-0 | 5.6 | 3.0 | 2.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Ae | 0-3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Bf1 | 3-18 | 0.1 | 0.1 | 0.1 | 1.1 | 0.4 | 2.4 | 0.4 |
| Bf2 | 18-46 | 0.1 | 0.0 | 0.0 | 0.3 | 0.5 | 0.4 | 0.5 |
| BC | 46-71 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.2 |
| C | 71-100 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.4 | 0.1 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LH | 3.8 | 3.3 | - | - | - | - | - | - | - | - |
| Ae | 3.9 | 3.2 | 2.3 | 5.9 | 6.5 | 21.5 | 30.3 | 66.5 | 30.4 | 3.1 |
| Bf1 | 4.8 | 4.3 | 3.3 | 6.4 | 6.1 | 20.3 | 19.5 | 55.6 | 38.8 | 5.6 |
| Bf2 | 5.0 | 4.6 | 4.5 | 7.0 | 6.5 | 22.9 | 23.5 | 64.4 | 31.2 | 4.4 |
| BC | 5.1 | 4.6 | 4.6 | 7.4 | 7.1 | 22.3 | 22.6 | 64.0 | 33.3 | 2.7 |
| C | 5.2 | 4.6 | 4.4 | 7.8 | 7.0 | 21.3 | 20.7 | 61.2 | 35.1 | 3.6 |

Table 2-7. Moderately-well drained HANSFORD SOIL

Location: UTM 20T MF 493340
NTS Map: 11E/5E
Slope and aspect: 9%; eastnortheast
Elevation : 135 m

Parent material : coarse loamy, till
Vegetation: spruce, fir, and birch forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 5-0 | | ...moderately decomposed forest litter... | | | | | | | |
| Ae | 0-15 | reddish brown (5YR 5/3m) | sandy loam | weak | coarse | platy | very friable | none | 10 | few |
| Bfj | 15-20 | yellowish red (5YR 4/6m) | sandy loam | weak | coarse | platy | very friable | none | 15 | abundant |
| Bf1 | 20-30 | yellowish red (5YR 5/8m) | gravelly sandy loam | moderate | medium | granular | friable | none | 25 | abundant |
| Bf2 | 30-53 | yellowish red (5YR 4/6m) | sandy loam | moderate | medium | granular | friable | none | 15 | plentiful |
| Bf3 | 53-64 | yellowish red (5YR 4/6m) | gravelly sandy loam | moderate | medium | granular | friable | none | 30 | very few |
| C | 64-100 | reddish brown (5YR 4/2m) | gravelly loam | structureless | | massive | firm | none | 30 | none |

Table 2-7. Moderately-well drained HANSFORD SOIL (continued)

ANALYSES

| Horizon | Depth | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | (cm) | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 5-0 | 10.5 | 2.0 | 0.7 | 0.3 | 0.9 | 0.1 | 0.3 |
| Ae | 0-15 | 0.1 | 0.1 | 0.1 | 0.0 | 0.6 | 0.1 | 0.1 |
| Bfj | 15-20 | 0.2 | 0.2 | 0.1 | 2.0 | 5.3 | 3.0 | 0.7 |
| Bf1 | 20-30 | 0.1 | 0.1 | 0.1 | 1.0 | 5.6 | 1.5 | 0.7 |
| Bf2 | 30-53 | 0.1 | 0.0 | 0.0 | 0.6 | 3.7 | 0.7 | 0.8 |
| Bf3 | 53-64 | 0.1 | 0.0 | 0.0 | 0.8 | 0.7 | 1.1 | 1.2 |
| C | 64-100 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LFH | 4.5 | 4.6 | - | - | - | - | - | - | - | - |
| Ae | 4.3 | 3.3 | 2.1 | 4.6 | 6.6 | 25.6 | 24.4 | 63.3 | 28.8 | 7.0 |
| Bfj | 4.3 | 3.7 | 3.8 | 5.5 | 6.6 | 24.0 | 19.6 | 59.5 | 30.3 | 10.7 |
| Bf1 | 4.7 | 4.2 | 3.8 | 5.1 | 6.4 | 24.4 | 23.4 | 63.1 | 27.5 | 9.4 |
| Bf2 | 4.9 | 4.4 | 4.1 | 4.8 | 5.7 | 22.9 | 20.9 | 58.4 | 33.0 | 8.6 |
| Bf3 | 4.9 | 4.5 | 6.4 | 5.9 | 5.2 | 18.7 | 24.6 | 60.8 | 23.6 | 15.5 |
| C | 5.1 | 4.1 | 6.9 | 4.6 | 3.0 | 19.6 | 13.2 | 47.3 | 43.3 | 9.4 |

Table 2-8. Well-drained HEBERT SOIL

Location: UTM 20T MF 285436

NTS MAP: 11E/12
Elevation : 240 m

Parent material : coarse loamy over sandy-skeletal, glaciofluvial sediments
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 1-0 | dark brown (7.5YR 3/2m) | ... moderately decomposed forest litter... | | | | | | | abundant |
| Ae | 0-3 | dark reddish brown (5YR 3/2m) | loam | moderate | medium | platy | very friable | none | 10 | plentiful |
| Bf1 | 3-25 | dark brown (7.5YR 3/2m) | sandy loam | weak | medium | granular | very friable | none | 15 | plentiful |
| Bf2 | 25-38 | reddish brown (5YR 4/4m) | gravelly sandy loam | moderate | medium | granular | friable | none | 20 | few |
| BC | 38-64 | brown (7.5YR 5/4m) | gravelly sandy loam | weak | coarse | platy | friable | none | 20 | none |
| C1 | 64-74 | dark reddish gray (5YR 4/2m) | loamy sand | weak | coarse | platy | friable | none | - | none |
| C2 | 74-100 | brown (10YR 5/3m) | very gravelly loamy sand | structureless | | single grain | loose | none | 50 | none |

Table 2-8. Well-drained HEBERT SOIL (continued)

**ANALYSES**

| Horizon | Depth | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | (cm) | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 1-0 | 12.2 | 3.7 | 2.0 | 0.5 | 0.2 | 0.8 | 0.2 |
| Ae | 0-3 | 0.8 | 0.3 | 0.1 | 0.4 | 0.1 | 1.0 | 0.1 |
| Bf1 | 3-25 | 0.5 | 0.1 | 0.1 | 1.0 | 0.7 | 1.9 | 0.4 |
| Bf2 | 25-38 | 0.5 | 0.0 | 0.1 | 0.2 | 0.4 | 0.6 | 0.3 |
| BC | 38-64 | 0.3 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.3 |
| C1 | 64-74 | 0.5 | 0.1 | 0.1 | 0.0 | 0.1 | 0.5 | 0.2 |
| C2 | 74-100 | 0.2 | 0.0 | 0.1 | 0.0 | 0.2 | 0.7 | 0.3 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LFH | 4.6 | 4.4 | - | - | - | - | - | - | - | - |
| Ae | 3.9 | 3.6 | 8.6 | 7.3 | 4.8 | 11.5 | 12.4 | 44.5 | 44.2 | 11.3 |
| Bf1 | 4.5 | 4.2 | 18.9 | 13.8 | 7.0 | 14.8 | 13.5 | 67.2 | 25.2 | 7.6 |
| Bf2 | 4.9 | 4.5 | 16.1 | 13.8 | 7.2 | 14.9 | 14.4 | 66.4 | 27.7 | 5.9 |
| BC | 5.1 | 4.6 | 12.4 | 10.9 | 6.2 | 13.7 | 11.5 | 54.7 | 40.3 | 5.0 |
| C1 | 5.2 | 4.7 | 15.7 | 15.9 | 9.0 | 18.6 | 14.9 | 74.1 | 24.1 | 1.8 |
| C2 | 5.1 | 4.6 | 16.8 | 15.7 | 10.0 | 18.2 | 14.9 | 75.6 | 19.8 | 4.6 |

Table 2-9. Imperfectly drained KIRKHILL SOIL

Slope and aspect: 25%; south
Site position: middle

Landform and parent material: hummocky, loamy skeletal, till veneer
Present land use: white spruce, fir, and feather moss forest
Stoniness: slightly stony
Rockiness: slightly rocky
Classification (1978): Gleyed Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 6-0 | | ...poorly decomposed forest litter... | | | | | | | abundant |
| Ah | 0-5 | dark yellowish brown (10YR 3/4m) | clay loam | moderate | very fine | granular | very friable | none | 15 | plentiful |
| Bf | 5-40 | dark yellowish brown (10YR 4/5m) | gravelly loam | weak to moderate | fine to medium | subangular blocky | very friable | none | 35 | plentiful |
| Bfgj | 40-75 | olive brown (2.5Y 4.5/4m) | gravelly loam | moderate | medium to coarse | subangular blocky | friable | common medium distinct Fe | 40 | few |
| R | 75+ | | ...fractured gray shale bedrock... | | | | | | | |

Table 2-9. Imperfectly drained KIRKHILL SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Total N (%) | C:N ratio | Exchangeable cations (meq/100 g soil) | | | | | Base sat. (%) | Pyrophosphate | | Dithionite | | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | Al | K | CEC | | Fe (%) | Al (%) | Fe (%) | Al (%) | Mn (%) | Fe (%) | Al (%) |
| LFH | 6-0 | 11.28 | 0.74 | 15.2 | 1.43 | 1.48 | 4.06 | 1.36 | 8.33 | 51.3 | - | - | 2.03 | 0.37 | 0.033 | 1.04 | 0.32 |
| Ah | 0-5 | 5.17 | 0.38 | 13.6 | 0.20 | 0.21 | 3.48 | 0.18 | 4.07 | 14.5 | 1.37 | 0.41 | 3.15 | 0.53 | 0.048 | 1.75 | 0.46 |
| Bf | 5-40 | 4.00 | 0.24 | 16.7 | 0.16 | 0.06 | 1.72 | 0.07 | 2.01 | 14.4 | 3.25 | 0.80 | 4.55 | 0.92 | 0.021 | 2.38 | 0.78 |
| Bfgj | 40-75 | 1.60 | 0.11 | 14.5 | 0.11 | 0.02 | 1.20 | 0.06 | 1.39 | 13.7 | 0.87 | 0.47 | 1.67 | 0.52 | 0.015 | 0.90 | 0.49 |
| R | 75+ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density (g/cm$^3$) | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | | |
| LFH | 3.9 | 3.4 | 20.3 | - | - | - | - | - | - | - | - | - | - | - | - |
| Ah | 4.4 | 3.8 | 9.3 | 5.8 | 5.6 | 2.9 | 4.8 | 6.4 | 25.5 | 47.4 | 27.1 | 28.5 | - | - | 0.14 |
| Bf | 4.6 | 4.2 | 7.2 | 11.1 | 6.3 | 2.8 | 4.2 | 6.1 | 30.5 | 48.2 | 21.3 | 50.5 | 1.2 | 12.3 | 0.24 |
| Bfgj | 5.1 | 4.3 | 2.9 | 16.9 | 10.6 | 4.8 | 6.6 | 5.9 | 44.8 | 38.2 | 17.0 | 54.4 | - | - | 0.23 |
| R | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 2-10. Moderately-well drained MILLBROOK SOIL

Location: 20T MF 336348
NTS Map: 11E/5W
Elevation: 240 m

Parent material : fine loamy, till
Vegetation: sugar maple forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| LFH | 3-0 | very dusky red (2.5YR 2.5/2m) | ...decomposed to semi-decomposed... |  |  |  |  |  |  | abundant |
| Bf1 | 0-15 | dark reddish grey (5YR 4/2m) | silt loam | moderate | medium | granular | very friable | none | 5 | plentiful |
| Bf2 | 15-51 | reddish brown (5YR 4/4m) | loam | moderate | coarse | subangular blocky | friable | none | 15 | plentiful |
| BC | 51-71 | dark reddish brown (5YR 3/4m) | loam | weak | coarse | platy | friable | none | 15 | none |
| Cg | 71-100 | reddish brown (5YR 4/3m) | gravelly loam | structureless |  | massive | firm | common distinct Fe | 20 | none |

Table 2-10. Moderately-well drained MILLBROOK SOIL (continued)

ANALYSES

| Horizon | Depth | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | Oxalate | |
|---|---|---|---|---|---|---|---|
| | (cm) | Ca | Mg | K | Fe (%) | Fe (%) | Al (%) |
| LFH | 3-0 | 7.1 | 1.7 | 0.8 | 0.4 | 0.6 | 0.1 |
| Bf1 | 0-15 | 1.0 | 0.2 | 0.1 | 1.0 | 1.5 | 0.6 |
| Bf2 | 15-51 | 0.9 | 0.2 | 0.1 | 0.9 | 1.2 | 0.5 |
| BC | 51-71 | 0.5 | 0.1 | 0.1 | 0.3 | 0.5 | 0.4 |
| C | 71-100 | 5.0 | 4.4 | 0.3 | 0.1 | 0.3 | 0.1 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LFH | 4.1 | 3.8 | - | - | - | - | - | - | - | - |
| Bf1 | 4.4 | 4.2 | 5.1 | 4.3 | 2.7 | 6.8 | 6.9 | 25.8 | 53.8 | 20.4 |
| Bf2 | 4.8 | 4.3 | 8.5 | 6.0 | 3.4 | 8.9 | 13.1 | 39.9 | 43.4 | 16.7 |
| BC | 4.9 | 4.4 | 5.5 | 7.9 | 5.2 | 12.5 | 11.1 | 42.2 | 44.6 | 13.2 |
| C | 6.1 | 4.9 | 9.3 | 7.9 | 5.2 | 11.0 | 9.3 | 42.7 | 32.7 | 24.6 |

Table 2-11. Well-drained PERCH LAKE SOIL

Slope and aspect: 10%; southeast
Site position: upper slope

Landform and parent material: hummocky, loamy skeletal, till
Present land use: fir and birch forest
Stoniness: very stony
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 6-0 | dark reddish brown (2.5YR 2.5/2m) | ... poorly decomposed forest litter... | | | | | | | abundant |
| Ae | 0-10 | brown (7.5YR 5/2m) | gravelly loam | moderate | fine to medium | subangular blocky | friable | none | 45 | abundant |
| Bf | 10-32 | strong brown (7.5YR 4/6m) | gravelly loam | weak | medium to coarse | subangular blocky | very friable | none | 30 | plentiful |
| BC | 32-70 | dark yellowish brown (10YR 4/4m) | gravelly sandy loam | weak | medium | subangular blocky | friable | none | 40 | very few |
| C | 70-100 | dark brown (7.5YR 4/3m) | gravelly sandy loam | structureless | | massive | friable | none | 45 | none |

Table 2-11. Well-drained PERCH LAKE SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Total N (%) | C:N ratio | Exchangeable cations (meq/100 g soil) | | | | | Base sat. (%) | Pyrophosphate | | Dithionite | | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | Al | K | CEC | | Fe (%) | Al (%) | Fe (%) | Al (%) | Mn (%) | Fe (%) | Al (%) |
| LFH | 6-0 | 32.40 | 1.02 | 31.8 | 10.20 | 2.96 | 0.67 | 1.52 | 15.35 | 95.6 | - | - | - | - | - | - | - |
| Ae | 6-10 | 1.10 | 0.07 | 15.7 | 0.28 | 0.27 | 1.67 | 0.09 | 2.31 | 27.7 | 0.07 | 0.03 | 0.54 | 0.06 | 0.007 | 0.08 | 0.06 |
| Bf | 10-32 | 4.38 | 0.22 | 19.9 | 0.30 | 0.07 | 1.50 | 0.08 | 1.95 | 23.1 | 1.02 | 1.00 | 3.20 | 1.52 | 0.043 | 1.50 | 1.68 |
| BC | 32-70 | 0.54 | 0.04 | 13.5 | 0.11 | 0.02 | 0.58 | 0.06 | 0.77 | 24.7 | 0.18 | 0.24 | 1.13 | 0.33 | 0.074 | 0.31 | 0.38 |
| C | 70-100 | 0.39 | 0.03 | 13.0 | 0.10 | 0.02 | 0.47 | 0.06 | 0.65 | 27.7 | 0.09 | 0.14 | 1.07 | 0.22 | 0.068 | 0.29 | 0.28 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density (g/cm$^3$) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | |
| LFH | 4.5 | 3.6 | 58.3 | - | - | - | - | - | - | - | - | - | - | - |
| Ae | 3.9 | 3.1 | 2.0 | 9.5 | 7.4 | 5.9 | 11.3 | 10.9 | 45.0 | 43.2 | 11.8 | 58 | - | 0.32 |
| Bf | 4.9 | 4.4 | 7.9 | 7.5 | 8.8 | 6.5 | 12.6 | 10.9 | 46.3 | 36.2 | 17.5 | 41 | 1.3 | 0.19 |
| BC | 5.2 | 4.5 | 1.0 | 18.5 | 12.7 | 8.3 | 14.6 | 10.8 | 64.9 | 22.2 | 12.9 | 42 | 1.5 | 0.26 |
| C | 5.0 | 4.5 | 0.7 | 19.8 | 13.6 | 8.8 | 15.6 | 11.0 | 68.8 | 18.5 | 12.7 | 59 | 1.7 | 0.23 |

Table 2-12. Moderately-well drained PORTAPIQUE SOIL

Location: UTM 20T MF 526317
NTS map: 11E/5E
Elevation: 66 m

Parent material : sandy, till
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 5-0 | dark brown (7.5YR 3/2m) | ...semi-decomposed organic matter... | | | | | | | |
| Bm1 | 0-8 | yellowish red (5YR 4/6m) | sandy loam | weak | medium | subangular blocky | friable | none | 15 | plentiful |
| Bf | 8-27 | reddish brown (5YR 4/4m) | sandy loam | weak | medium | subangular blocky | friable | none | 15 | plentiful |
| Bm2 | 27-44 | yellowish red (5YR 4/6m) | loamy sand | weak | medium | subangular blocky | friable | none | 15 | few |
| BC | 44-67 | dark reddish brown (5YR 3/3m) | gravelly sand | weak | coarse | platy | friable | none | 25 | few |
| C | 67-100 | dark reddish brown (5YR 3/3m) | gravelly sand | structureless | | massive | firm | none | 30 | none |

Table 2-12. Moderately-well drained PORTAPIQUE SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | |
|---|---|---|---|---|---|
| | | | Ca | Mg | K |
| LFH | 5-0 | 14.1 | 1.3 | 0.4 | 0.2 |
| Bm1 | 0-8 | 3.9 | 0.3 | 0.6 | 0.1 |
| Bf | 8-27 | 0.8 | 0.2 | 0.1 | 0.1 |
| Bm2 | 27-44 | 1.4 | 0.2 | 0.0 | 0.1 |
| BC | 44-67 | 0.8 | 0.1 | 0.1 | 0.1 |
| C | 67-100 | 0.4 | 0.2 | 0.0 | 0.0 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| LFH | 4.5 | 3.8 | 24.0 | - | - | - | - | - | - | - | - |
| Bm1 | 4.7 | 4.3 | 6.9 | 7.6 | 8.4 | 8.7 | 19.1 | 10.4 | 54.4 | 34.0 | 11.6 |
| Bf | 4.3 | 4.3 | 1.3 | 8.6 | 9.0 | 9.1 | 19.0 | 13.3 | 59.0 | 28.7 | 12.3 |
| Bm2 | 4.6 | 4.5 | 2.4 | 20.4 | 12.9 | 11.1 | 20.6 | 8.3 | 73.3 | 18.0 | 8.7 |
| BC | 4.8 | 4.5 | 1.4 | 20.3 | 18.6 | 13.0 | 19.7 | 7.7 | 79.4 | 13.3 | 7.3 |
| C | 5.0 | 4.6 | 0.7 | 30.6 | 26.5 | 18.0 | 16.5 | 2.5 | 94.1 | 3.6 | 2.3 |

Table 2-13. Imperfectly drained PUGWASH SOIL

Location: UTM 20T MF 752048
NTS map: 11E/13
Slope and aspect: 4%; northeast

Parent material: coarse loamy, till
Classification (1978): Gleyed Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 5-0 | | ...moderately decomposed forest litter... | | | | | | | |
| Ae | 0-3 | pinkish gray (5YR 6/2m) | sandy loam | weak | medium | granular | very friable | none | 5 | plentiful |
| Bm1 | 3-28 | yellowish red (5YR 4/6m) | sandy loam | strong | medium | subangular blocky | very friable | none | 5 | few |
| Bf | 28-46 | yellowish red (5YR 5/6m) | sandy loam | weak | coarse | platy | friable | none | 10 | very few |
| Bxjgj | 46-73 | reddish brown (5YR 4/4m) | sandy loam | moderate | coarse | platy | firm | common fine faint Fe | 10 | very few |
| BCxgj | 73-127 | reddish brown (5YR 4/4m) | sandy loam | weak | coarse | platy | firm | common medium distinct Fe | 10 | none |
| C | 123-147 | reddish brown (5YR 4/4m) | sandy loam | structureless | | massive | very firm | none | 10 | none |

Table 2-13. Imperfectly drained PUGWASH SOIL (continued)

ANALYSES

| Horizon | Depth | Exchangeable cations (meq/100g soil) | | |
|---|---|---|---|---|
| | (cm) | Ca | Mg | K |
| LFH | 5-0 | 3.3 | 0.5 | 0.3 |
| Ae | 0-3 | 0.4 | 0.1 | 0.1 |
| Bm | 3-28 | 0.2 | 0.0 | 0.1 |
| Bf | 28-46 | 0.3 | 0.0 | 0.4 |
| Bxjgj | 46-73 | 0.2 | 0.0 | 0.3 |
| BCxgj | 73-127 | 2.7 | 1.1 | 0.4 |
| C | 127-147 | 3.6 | 1.3 | 0.2 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | | Bulk density (g/cm$^3$) | Hydraulic conductivity (cm/h) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | |
| LFH | 4.4 | 3.7 | - | - | - | - | - | - | - | - | - | - |
| Ae | 3.7 | 3.3 | 4.9 | 9.6 | 11.1 | 25.5 | 12.7 | 63.8 | 31.7 | 5.1 | - | - |
| Bm | 4.7 | 4.3 | 5.1 | 9.1 | 9.6 | 23.5 | 11.8 | 61.5 | 27.9 | 10.6 | 1.5 | 39.4 |
| Bf | 4.9 | 4.7 | 7.6 | 10.7 | 10.5 | 24.1 | 7.9 | 60.8 | 27.1 | 12.1 | 1.4 | 4.9 |
| Bxjgj | 4.8 | 4.5 | 4.8 | 5.5 | 8.4 | 39.0 | 15.4 | 73.2 | 22.4 | 4.4 | 1.8 | 10.3 |
| BCxgj | 5.5 | 4.5 | 3.2 | 5.2 | 6.3 | 20.3 | 19.7 | 54.7 | 32.1 | 13.2 | 2.1 | 0.2 |
| C | 5.8 | 4.8 | 3.2 | 4.4 | 4.7 | 17.7 | 22.8 | 52.8 | 34.6 | 12.6 | 2.0 | 0.0 |

Table 2-14. Imperfectly drained QUEENS SOIL

Location: UTM 20T MF 7086 9615
NTS map: Shubenacadie 11E/3
Slope and aspect: 4%; northeast
Site position: upper slope

Landform and parent material: rolling, fine loamy, till
Stoniness: nonstony
Rockiness: nonrocky
Present land use: forage
Classification (1978): Gleyed Podzolic Gray Luvisol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| Ap | 0-19 | dark brown (7.5YR 3.5/4m) | loam | moderate | fine | granular | friable | none | 5 | plentiful |
| Bf | 19-30 | reddish brown (5YR 4/4m) | loam | moderate | fine | granular | very friable | none | 5 | plentiful |
| Bg | 30-45 | brown (7.5YR 4.5/4m) | loam | weak | fine to medium | subangular blocky | firm | common medium prominent Fe | 5 | few |
| Btgj | 45-70 | dark reddish brown (5YR 3/4m) | loam | weak | fine to medium | angular blocky | very firm | few medium faint Fe<br>common medium distinct Mn | 5 | very few |
| C | 70-100 | dark reddish brown (5YR 3/4m) | loam | very weak | very coarse | pseudo platy | very firm | few coarse faint Fe<br>common medium distinct Mn | 10 | none |

Table 2-14. Imperfectly drained QUEENS SOIL (continued)

ANALYSES

| Horizon | Depth | pH | | Organic C | Exchangeable cations (meq/100 g soil) | | | | | Pyrophosphate | | Particle size distribution (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (cm) | $H_2O$ | $CaCl_2$ | (%) | Ca | Mg | Al | K | Na | Fe (%) | Al (%) | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay |
| Ap | 0-19 | 5.9 | 5.0 | 2.91 | 7.38 | 3.36 | - | 0.18 | 0.03 | 0.59 | 0.22 | 2.9 | 5.3 | 5.1 | 11.3 | 11.1 | 35.7 | 40.5 | 23.8 |
| Bf | 19-30 | 5.3 | 4.4 | 1.63 | 2.34 | 0.66 | 3.00 | 0.11 | 0.08 | 0.69 | 0.31 | 2.5 | 5.6 | 6.0 | 15.0 | 12.5 | 41.6 | 35.0 | 23.4 |
| Bg | 30-45 | 5.3 | 4.4 | 0.25 | 1.68 | 0.34 | 1.11 | 0.07 | 0.00 | 0.22 | 0.13 | 2.3 | 5.4 | 7.2 | 17.9 | 15.5 | 48.3 | 34.9 | 16.8 |
| Btgj | 45-70 | 5.6 | 5.0 | 0.10 | 6.98 | 2.01 | - | 0.17 | 0.00 | 0.04 | 0.03 | 2.3 | 4.9 | 6.1 | 15.0 | 14.7 | 43.0 | 32.9 | 24.1 |
| Cgj | 70-100 | 7.0 | 6.4 | 0.10 | 16.00 | 2.04 | - | 0.18 | 0.00 | 0.02 | 0.01 | 2.2 | 4.8 | 6.1 | 15.7 | 12.6 | 41.5 | 34.9 | 23.7 |

| Horizon | (%) passing sieve | | | | Atterburg limits | | Classification | | Bulk density ($g/cm^3$) | Hydraulic conductivity (cm/h) | Moisture retention (% vol.) | | | | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | (-kPa) | | | | |
| | No. 4 | No.10 | No. 40 | No. 200 | Liquid | Plastic | Unified | AASHO | | | 10 | 30 | 300 | 1500 | |
| Ap | 95.3 | 93.3 | 84.6 | 65.5 | 46.3 | 38.1 | ML | A-5 | 1.4 | 5.6 | 33.1 | 25.8 | 18.4 | 17.7 | 0.22 |
| Bf | 90.6 | 88.3 | 78.9 | 58.8 | 38.7 | 30.1 | ML | A-4 | 1.3 | 5.3 | 31.0 | 23.0 | 17.7 | 16.4 | 0.29 |
| Bg | 96.9 | 94.5 | 85.8 | 57.4 | 22.8 | 16.9 | CL-ML | A-4 | 1.7 | 3.3 | 23.8 | 13.6 | 13.3 | 12.4 | 0.49 |
| Btgj | 97.6 | 95.5 | 87.4 | 61.2 | 27.7 | 16.2 | CL | A-6 | 1.9 | 0.4 | 20.5 | 15.0 | 11.8 | 11.5 | 0.48 |
| Cgj | 79.9 | 77.9 | 71.3 | 50.3 | 25.9 | 15.6 | Cl | A-6 | 2.0 | 0.06 | 21.7 | 17.2 | 13.4 | 12.4 | 0.48 |

Table 2-15. Well-drained RAWDON SOIL

Slope and aspect: 4%; south

Parent material: loamy skeletal, till veneer over gray shale bedrock
Vegetation: sugar maple, beech, yellow birch, and fir forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 10-0 | ...semi-decomposed forest litter... | | | | | | | | |
| Ae | 0-5 | light brownish gray (10YR 6/2m) | silt loam | strong | medium | platy | friable | none | 10 | abundant |
| Bf1 | 5-20 | yellowish brown (10YR 5/6m) | gravelly loam | strong | coarse | granular | friable | none | 20 | abundant |
| Bf2 | 20-46 | strong brown (7.5YR 5/6m) | gravelly silt loam | moderate | medium | platy | friable | none | 20 | few |
| Bf3 | 46-75 | light olive brown (2.5YR 5/4m) | gravelly loam | weak | coarse | subangular blocky | friable | none | 40 | few |
| R | 75+ | - | - | - | - | - | - | - | - | - |

Table 2-15. Well-drained RAWDON SOIL (continued)

**ANALYSES**

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | Al | K | CEC | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 10-0 | - | - | - | - | - | - | - | - | - | - |
| Ae | 0-5 | 2.2 | 0.8 | 0.5 | 4.4 | 0.1 | 5.8 | 0.2 | 0.1 | 0.2 | 0.2 |
| Bf1 | 5-20 | 3.4 | 0.4 | 0.1 | 3.2 | 0.1 | 3.8 | 1.9 | 0.8 | 2.0 | 0.9 |
| Bf2 | 20-46 | 0.9 | 0.3 | 0.1 | 3.5 | 0.1 | 4.0 | 1.1 | 0.5 | 1.2 | 0.5 |
| Bf3 | 46-75 | 0.5 | 0.3 | 0.1 | 1.6 | 0.1 | 2.1 | 0.8 | 0.4 | 0.9 | 0.6 |
| R | 75+ | - | - | - | - | - | - | - | - | - | - |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | |
| LFH | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ae | 4.4 | 3.8 | 3.8 | 4.4 | 2.1 | 1.1 | 2.9 | 3.9 | 14.4 | 58.6 | 27.0 | 15.0 | 0.28 |
| Bf1 | 5.1 | 4.5 | 5.7 | 15.8 | 8.4 | 3.1 | 6.2 | 3.5 | 37.0 | 41.3 | 21.7 | 35.0 | 0.23 |
| Bf2 | 5.0 | 4.5 | 1.5 | 13.7 | 5.5 | 1.7 | 4.4 | 4.1 | 29.4 | 51.2 | 19.4 | 35.0 | 0.44 |
| Bf3 | 5.3 | 4.7 | 0.8 | 18.2 | 10.0 | 2.8 | 5.7 | 4.1 | 40.8 | 42.5 | 16.7 | 50.0 | 0.40 |
| R | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 2-16. Well-drained ROSSWAY SOIL

Location: UTM 20T MF 194271
NTS map: 21H/8
Slope and aspect: 4%; west
Elevation: 160 m

Parent material: loamy skeletal, till
Classification (1978): Sombric Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| LF | 5-0 |  | ...poorly decomposed forest litter... |  |  |  |  |  |  |  |
| Ah | 0-10 | dark brown (7.5YR 3/2m) | loam | weak | fine | granular | very friable | none | - | plentiful |
| Bf1 | 10-20 | dark reddish brown (5YR 3/3m) | very gravelly loam | moderate | medium | subangular blocky | very friable | none | 60 | plentiful |
| Bf2 | 20-37 | reddish brown (5YR 4/4m) | very gravelly loam | moderate | coarse | subangular blocky | friable | none | 65 | few |
| Bf3 | 37-54 | yellowish red (5YR 4/6m) | very gravelly sandy loam | moderate | coarse | subangular blocky | friable | none | 70 | very few |
| R | 54+ | - | - | - | - | - | - | - | - | - |

Table 2-16. Well-drained ROSSWAY SOIL (continued)

**ANALYSES**

| Horizon | Depth | Organic C | Exchangeable cations (meq/100 g soil) | | | | |
|---|---|---|---|---|---|---|---|
| | (cm) | (%) | Ca | Mg | Al | K | CEC |
| LF | 5-0 | 24.8 | 32.6 | 6.9 | 2.9 | 3.5 | 45.9 |
| Ah | 0-10 | 3.6 | 13.6 | 2.4 | 0.3 | 0.3 | 16.6 |
| Bf1 | 10-20 | 2.6 | 12.4 | 1.7 | 0.3 | 0.4 | 14.8 |
| Bf2 | 20-37 | 1.7 | 7.5 | 1.0 | 0.5 | 0.2 | 9.2 |
| Bf3 | 37-54 | 1.4 | 0.6 | 1.1 | 0.4 | 0.3 | 7.8 |
| R | 54+ | - | - | - | - | - | - |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | |
| LF | 5.2 | 5.1 | 42.1 | - | - | - | - | - | - | - | - | - | - |
| Ah | 5.6 | 5.1 | 6.2 | 2.2 | 4.5 | 2.2 | 14.2 | 16.0 | 39.1 | 39.7 | 21.2 | 338.0 | 0.22 |
| Bf1 | 5.7 | 5.2 | 4.4 | 8.9 | 5.3 | 3.5 | 10.9 | 15.8 | 44.4 | 36.9 | 18.7 | 157.0 | 0.27 |
| Bf2 | 5.8 | 5.2 | 2.9 | 10.4 | 7.5 | 4.3 | 12.9 | 13.5 | 48.6 | 35.3 | 16.1 | 103.9 | 0.32 |
| Bf3 | 6.1 | 5.2 | 2.3 | 11.3 | 10.7 | 4.9 | 16.7 | 15.2 | 58.8 | 29.8 | 11.4 | - | 0.32 |
| R | - | - | - | - | - | - | - | - | - | - | - | - | - |

Table 2-17. Poorly drained STEWIACKE SOIL

Location: UTM 20T MF 904067
NTS map: 11/13
Slope and aspect: 3%; northwest

Parent material: fine silty, alluvium
Classification (1978): Rego Gleysol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| Ah | 0-25 | dark reddish gray (5YR 4/2m) | silty clay | strong | medium | granular | - | - | 0 | plentiful |
| C2 | 25-45 | dark grayish brown (10YR 4/2m) | silty clay | moderate | medium | subangular blocky | friable | none | 0 | few |
| Cg1 | 45-62 | grayish brown (10YR 5/2.5m) | silty clay loam | structureless |  | massive | firm | common medium distinct Fe | 0 | none |
| Cg2 | 62-89 | gray (5GY 5/1m) | silty clay loam | structureless |  | massive | very firm | many medium prominent Fe | 0 | none |
| Cg3 | 89-98 | gray (5GY 5/1m) | silt loam | structureless |  | massive | very firm | common distinct Fe | 0 | none |
| Cg4 | 98-107 | gray (5GY 5/1m) | clay loam | structureless |  | massive | very firm | many coarse prominent Fe | 0 | none |

Table 2-17. Poorly drained STEWIACKE SOIL

**ANALYSES**

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | |
|---|---|---|---|---|---|
| | | | Ca | Mg | K |
| Ah | 0-25 | 2.9 | 0.9 | 0.5 | 0.2 |
| C2 | 25-45 | 0.6 | 1.4 | 0.9 | 0.1 |
| Cg1 | 45-62 | 0.3 | 1.8 | 1.1 | 0.1 |
| Cg2 | 62-89 | 0.1 | 2.1 | 1.3 | 0.1 |
| Cg3 | 89-98 | 0.2 | 1.9 | 1.1 | 0.1 |
| Cg4 | 98-107 | 0.2 | 3.9 | 1.7 | 0.1 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Bulk density (g/cm$^3$) | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | |
| Ah | 4.3 | 4.0 | 5.0 | 0.4 | 0.2 | 0.1 | 0.5 | 3.2 | 4.4 | 46.6 | 49.0 | 1.1 | 47.5 | 0.23 |
| C2 | 5.3 | 4.4 | 1.1 | 0.1 | 0.6 | 0.4 | 0.6 | 1.9 | 3.6 | 49.8 | 46.6 | 1.3 | 0.9 | 0.36 |
| Cg1 | 5.1 | 4.2 | 0.5 | 0.0 | 0.1 | 0.3 | 3.5 | 3.9 | 3.9 | 53.1 | 39.1 | 1.8 | 0.2 | 0.42 |
| Cg2 | 5.1 | 4.2 | 0.2 | 0.0 | 0.0 | 0.1 | 1.0 | 3.9 | 5.0 | 59.5 | 35.5 | 1.7 | 0.1 | 0.53 |
| Cg3 | 5.1 | 4.1 | 0.4 | 0.0 | 0.1 | 0.1 | 5.7 | 17.6 | 23.5 | 52.9 | 23.6 | 1.8 | 0.0 | 0.73 |
| Cg4 | 5.1 | 4.3 | 0.3 | 0.1 | 0.5 | 1.1 | 5.6 | 12.8 | 20.1 | 48.0 | 31.9 | 1.6 | 0.0 | 0.60 |

Table 2-18. Moderately-well drained THOM SOIL

Slope and aspect: 2%; northwest
Site position: upper slope

Landform and parent material: hummocky, loamy skeletal, till
Present land use: abandoned farmland
Stoniness: nonstony
Rockiness: nonrocky
Classification (1978): Sombric Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| Ahp | 0-23 | dark yellowish brown (10 YR 3/5m) | gravelly loam | weak | fine to medium | granuler | very friable | none | 40 | abundant |
| Bf | 23-50 | strong brown (7.5YR 3.5/6m) | gravelly loam | weak | fine | subangular blocky | very friable | none | 45 | plentiful |
| BCgj | 50-70 | dark yellowish brown (10YR 4/4m) | gravelly loam | moderate | fine to medium | subangular blocky | friable | few fine faint Fe | 40 | none |
| C | 70-100 | dark brown brown (10YR 4/3m) | gravelly loam | weak to moderate | fine to medium | subangular blocky | firm | none | 45 | none |

Table 2-18. Moderately-well drained THOM SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Total N (%) | C:N ratio | Exchangeable cations (meq/100 g soil) | | | | | Base sat. (%) | Pyrophosphate | | Dithionite | | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | Al | K | CEC | | Fe (%) | Al (%) | Fe (%) | Al (%) | Mn (%) | Fe (%) | Al (%) |
| Ahp | 0-23 | 3.74 | 0.33 | 11.3 | 1.00 | 0.04 | 2.28 | 0.10 | 3.42 | 33.3 | 1.09 | 0.38 | 2.69 | 0.45 | 0.08 | 1.67 | 0.43 |
| Bf | 23-50 | 2.49 | 0.18 | 13.8 | 0.28 | 0.18 | 0.16 | 0.06 | 1.13 | 46.0 | 1.22 | 0.95 | 3.55 | 1.09 | 0.08 | 1.72 | 1.09 |
| BCgj | 50-70 | 0.19 | 0.06 | 3.17 | 1.05 | 0.29 | 2.64 | 0.12 | 4.10 | 35.6 | 0.09 | 0.17 | 2.06 | 0.29 | 0.09 | 0.36 | 0.26 |
| C | 70-100 | 0.15 | 0.03 | 5.0 | 1.05 | 0.15 | 3.56 | 0.09 | 4.85 | 26.6 | 0.08 | 0.17 | 1.84 | 0.23 | 0.06 | 0.37 | 0.24 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt) | Bulk density (g/cm$^3$) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | | |
| Ahp | 4.4 | 3.9 | 6.73 | 15.7 | 8.3 | 4.0 | 6.4 | 7.1 | 41.5 | 37.4 | 21.1 | 60 | 1.2 | 0.17 |
| Bf | 5.0 | 4.5 | 4.48 | 16.0 | 8.6 | 4.6 | 5.8 | 6.1 | 41.1 | 43.2 | 15.7 | 64 | 1.5 | 0.27 |
| BCgj | 5.0 | 4.6 | 0.34 | 16.6 | 5.5 | 5.4 | 7.4 | 6.7 | 45.6 | 37.4 | 17.0 | 55 | 1.6 | 0.31 |
| C | 5.0 | 4.2 | 0.27 | 12.2 | 8.8 | 4.5 | 8.7 | 10.1 | 44.3 | 37.8 | 17.9 | 57 | 1.8 | 0.35 |

Table 2-19. Well-drained TRURO SOIL

Location: UTM 20T MF 553282
NTS map: 11E/5E
Slope and aspect: 8%; south
Elevation: 30 m

Parent material: sandy glaciofluvial sediments
Vegetation: white spruce, fir, and feather moss forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| LF | 3-0 | dark brown (7.5YR 3/2m) | ...needle and moss litter... |  |  |  |  |  |  |  |
| Ae | 0-3 | brown (7.5YR 5/4m) | loam | weak | fine | platy | loose | none | 0 | abundant |
| Bf1 | 3-20 | dark brown (7.5YR 4/4m) | sandy loam | moderate | coarse | platy | very friable | none | 0 | plentiful |
| Bf2 | 20-48 | yellowish red (5YR 4/8m) | sandy loam | weak | coarse | platy | very friable | none | 0 | none |
| Bf3 | 48-58 | dark reddish brown (5YR 3/4m) | sandy loam | moderate | medium | subangular blocky | friable | none | 0 | few |
| BC | 58-76 | red (2.5YR 4/6m) | loamy sand | moderate | medium | subangular blocky | friable | none | 0 | none |
| C | 76-100 | reddish brown (2.5YR 4/4m) | loamy sand | weak | medium | platy | very friable | none | 0 | none |

Table 2-19. Well-drained TRURO SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Exchangeable cations (meq./100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LF | 3-0 | 15.7 | 4.0 | 1.9 | 0.1 | 0.2 | 0.1 | 0.2 |
| Ae | 0-3 | 0.3 | 0.2 | 0.1 | 0.5 | 0.3 | 0.6 | 0.4 |
| Bf1 | 3-20 | 0.3 | 0.2 | 0.1 | 1.0 | 0.4 | 1.5 | 0.8 |
| Bf2 | 20-48 | 0.3 | 0.2 | 0.0 | 1.0 | 0.4 | 1.6 | 0.1 |
| Bf3 | 48-58 | 0.0 | 0.1 | 0.0 | 0.2 | 0.5 | 0.3 | 1.3 |
| BC | 58-76 | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 | 0.0 | 0.3 |
| C | 76-100 | 0.6 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 |

| Horizon | pH | | Particle size distribution (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS-MS | FS | VFS | Total sand | Silt | Clay |
| LF | 4.5 | 4.2 | - | - | - | - | - | - |
| Ae | 4.3 | 3.9 | 11.0 | 16.9 | 17.1 | 45.0 | 37.3 | 17.7 |
| Bf1 | 5.0 | 4.1 | 14.4 | 17.8 | 22.1 | 54.3 | 33.0 | 12.7 |
| Bf2 | 4.8 | 4.2 | 15.3 | 18.2 | 20.9 | 54.4 | 33.7 | 11.9 |
| Bf3 | 5.4 | 4.6 | 19.9 | 26.0 | 29.3 | 75.2 | 16.1 | 8.7 |
| BC | 5.4 | 4.6 | 27.7 | 29.4 | 25.7 | 82.8 | 14.2 | 3.0 |
| C | 5.5 | 4.5 | 23.0 | 22.4 | 31.6 | 77.0 | 18.0 | 5.0 |

Table 2-20. Well-drained WESTBROOK SOIL

Location: UTM 20T MF 883437
Slope and aspect: 12%; east
Elevation: 225 m

Parent material: coarse loamy till veneer over conglomerate bedrock
Vegetation: beech, yellow birch, sugar maple, fir, hemlock, and spruce forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 12-0 | | ...poorly decomposed forest litter... | | | | | | | |
| Ae | 0-8 | weak red (10R 5/2m) | silt loam | moderate | fine | subangular blocky | friable | none | 5 | abundant |
| Bf1 | 8-18 | reddish brown (5YR 4/3m) | loam | moderate | fine | subangular blocky | friable | none | 10 | few |
| Bf2 | 18-44 | reddish brown (5YR 4/3m) | gravelly loam | moderate | fine | subangular blocky | friable | none | 20 | few |
| Bf3 | 44-67 | dusky red (10R 3/3m) | gravelly | moderate | coarse | subangular blocky | firm | none | 30 | very few |
| C | 67-100 | dusky red (10R 3/3m) | very gravelly sandy loam | structureless | | massive | firm | none | 55 | none |

Table 2-20. Well-drained WESTBROOK SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | Al | K | CEC | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 12-0 | - | - | - | - | - | - | - | - | - | - |
| Ae | 0-8 | 2.1 | 0.9 | 0.4 | 7.7 | 0.1 | 9.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Bf1 | 8-18 | 3.8 | 0.6 | 0.2 | 2.2 | 0.1 | 3.1 | 1.0 | 1.2 | 1.2 | 1.3 |
| Bf2 | 18-44 | 1.3 | 0.4 | 0.1 | 1.7 | 0.1 | 2.3 | 0.6 | 0.5 | 0.8 | 0.6 |
| Bf3 | 44-67 | 1.1 | 0.5 | 0.1 | 0.9 | 0.1 | 1.6 | 0.2 | 0.5 | 0.3 | 0.6 |
| C | 67-100 | 0.4 | 0.4 | 0.1 | 0.4 | 0.1 | 1.0 | 0.1 | 0.2 | 0.1 | 0.4 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Hydraulic conductivity (cm/h) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | |
| LFH | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Ae | 4.2 | 3.7 | 3.6 | 7.5 | 3.5 | 1.2 | 4.6 | 9.8 | 26.6 | 57.6 | 15.8 | 42.2 | 0.38 |
| Bf1 | 4.9 | 4.5 | 6.5 | 14.2 | 8.5 | 3.0 | 7.0 | 9.0 | 41.7 | 46.0 | 12.3 | - | 0.34 |
| Bf2 | 5.1 | 4.7 | 2.2 | 13.5 | 7.8 | 2.6 | 7.5 | 10.8 | 42.2 | 46.9 | 10.9 | - | 0.43 |
| Bf3 | 5.3 | 4.8 | 1.8 | 13.7 | 8.4 | 2.3 | 5.8 | 12.8 | 43.0 | 47.4 | 9.6 | - | 0.50 |
| C | 5.3 | 4.9 | 0.4 | 30.0 | 16.4 | 4.9 | 9.6 | 7.3 | 68.4 | 24.9 | 6.7 | - | 0.32 |

Table 2-21. Imperfectly drained WOODBOURNE SOIL

Location: UTM 20T MF 029148
NTS map: 11E/7W

Parent material: fine loamy till
Classification (1978): Gleyed Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LFH | 5-0 | | ...semi-decomposed organic matter... | | | | | | | |
| Aeg | 0-2 | reddish gray (5YR 5/2m) | loam | weak | fine | subangular blocky | very friable | none | - | abundant |
| Bf1 | 2-22 | yellowish red (5YR 5/6m) | loam | weak | fine | subangular blocky | very friable | none | 15 | abundant |
| Bf2 | 22-36 | reddish brown (5YR 4/4m) | gravelly loam | weak | fine | platy | very friable | few, fine faint Fe | 30 | plentiful |
| Bmgj | 36-60 | reddish brown (5YR 4/3m) | gravelly sandy loam | moderate | medium | platy | friable | few, fine faint Fe | 30 | very few |
| BCg | 60-72 | dark reddish brown (5YR 3/4m) | gravelly loam | strong | medium | angular blocky | firm | common, medium distinct Fe | 30 | none |
| BC | 72-85 | dark reddish brown (5YR 3/4m) | gravelly loam | structureless | | massive | firm | none | 30 | none |
| C | 85-100 | dark reddish brown (5YR 3/4m) | gravelly loam | structureless | | massive | firm | none | 20 | none |

Table 2-21. Imperfectly drained WOODBOURNE SOIL (continued)

**ANALYSES**

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | Al | K | CEC | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 5-0 | - | 9.4 | 4.3 | 3.4 | 1.1 | 18.2 | 0.3 | 0.2 | 0.3 | 0.2 |
| Aej | 0-2 | - | 3.0 | 1.5 | 0.2 | 0.9 | 5.6 | 0.2 | 0.2 | 0.3 | 0.2 |
| Bf1 | 2-22 | - | 0.1 | 0.0 | 2.0 | 0.1 | 2.2 | 0.6 | 0.5 | 1.0 | 0.6 |
| Bf2 | 22-36 | 1.4 | 0.1 | 0.0 | 1.3 | 0.1 | 1.5 | 0.7 | 0.5 | 0.9 | 0.6 |
| Bmgj | 36-60 | 0.4 | 0.1 | 0.0 | 0.9 | 0.1 | 1.1 | 0.2 | 0.3 | 0.4 | 0.4 |
| BCg | 60-72 | 0.1 | 0.1 | 0.1 | 2.8 | 0.1 | 3.1 | 0.1 | 0.1 | 0.3 | 0.2 |
| BC | 72-85 | 0.1 | 0.2 | 0.2 | 2.8 | 0.1 | 3.3 | 0.1 | 0.1 | 0.3 | 0.2 |
| C | 85-100 | 0.06 | 0.1 | 0.4 | 2.8 | 0.1 | 3.4 | 0.1 | 0.1 | 0.3 | 0.2 |

| Horizon | pH | | Particle size distribution (%) | | | | | | | | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | |
| LFH | 4.2 | 3.5 | - | - | - | - | - | - | - | - | - |
| Ae | - | - | - | - | - | - | - | - | - | - | - |
| Bf1 | 4.9 | 4.4 | 4.2 | 5.0 | 6.1 | 11.7 | 8.9 | 36.9 | 46.1 | 18.0 | 0.45 |
| Bf2 | 5.1 | 4.4 | 5.7 | 5.6 | 7.0 | 12.1 | 8.8 | 39.2 | 43.1 | 17.7 | 0.44 |
| Bmgj | 5.2 | 4.4 | 7.6 | 7.3 | 9.2 | 17.2 | 12.5 | 53.8 | 35.4 | 10.9 | 0.54 |
| BCg | 5.1 | 4.2 | 8.8 | 8.5 | 8.7 | 11.0 | 7.6 | 44.6 | 34.9 | 20.5 | 0.39 |
| BC | 5.3 | 4.2 | 9.3 | 9.5 | 9.9 | 12.4 | 8.1 | 49.2 | 33.7 | 17.1 | 0.41 |
| C | 5.3 | 4.1 | 7.3 | 6.6 | 7.1 | 11.1 | 7.9 | 40.0 | 36.5 | 23.5 | 0.39 |

Table 2-22. Moderately well-drained WOODVILLE SOIL

Location: UTM 20T MF 740527
NTS map: 11E/6W
Slope: 2.5-5%
Elevation: 30 m

Parent material: coarse loamy till derived from Triassic sandstone
Vegetation: white spruce and feather moss forest
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (moist) | Texture | Structure | | | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Grade | Size | Kind | | | | |
| LF | 8-5 | | ...poorly decomposed forest litter... | | | | | | | |
| H | 5-0 | black<br>(5YR 2/2m) | ...well decomposed forest litter... | | | | | | | |
| Bfj | 0-8 | dark reddish brown<br>(5YR 3/2m) | sandy loam | moderate | fine | granular | very friable | none | 5 | plentiful |
| Ae | 8-23 | light reddish brown<br>(5YR 6/3m) | sandy loam | weak | fine | platy | very friable | none | 5 | plentiful |
| Bf1 | 23-36 | yellowish red<br>(5YR 4/6m) | sandy loam | moderate | coarse | platy | friable | none | 10 | plentiful |
| Bf2 | 36-53 | yellowish red<br>(5YR 4/6m) | sandy loam | moderate | fine | platy | friable | none | 5 | few |
| BC | 53-81 | reddish brown<br>(5YR 4/3m) | sandy loam | moderate | coarse | subangular blocky | firm | none | 10 | very few |
| C | 81-100 | dark reddish brown<br>(5YR 3/4m) | sandy loam | strong | coarse | subangular blocky | firm | none | 10 | none |

Table 2-22. Moderately-well drained WOODVILLE SOIL (continued)

**ANALYSES**

| Horizon | Depth | Exchangeable cations (meq/100 g soil) | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|
| | (cm) | Ca | Mg | K | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LF | 8-5 | 4.4 | 0.8 | 0.7 | 0.1 | 0.1 | - | - |
| H | 5-0 | 5.5 | 1.7 | 1.1 | 0.4 | 0.3 | 0.5 | 0.3 |
| Bfj | 0-8 | 0.5 | 0.1 | 0.2 | 0.5 | 0.3 | 0.7 | 0.3 |
| Ae | 8-23 | 0.3 | 0.1 | 0.1 | - | 0.1 | 0.1 | 0.1 |
| Bf1 | 23-36 | 0.4 | 0.1 | 0.1 | 0.9 | 0.4 | 1.2 | 0.7 |
| Bf2 | 36-53 | 0.5 | 0.1 | 0.1 | 0.3 | 0.4 | 0.4 | 0.5 |
| BC | 53-81 | 1.6 | 0.7 | 0.1 | 0.1 | 0.1 | 0.4 | 0.2 |
| C | 81-100 | 2.9 | 1.3 | 0.1 | 0.0 | 0.1 | 0.4 | 0.2 |

| Horizon | pH | | Particle size distribution (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | VCS+MS | FS | VFS | Total sand | Silt | Clay |
| LF | 4.4 | 4.5 | - | - | - | - | - | - |
| H | 3.6 | 3.2 | - | - | - | - | - | - |
| Bfj | 4.3 | 3.2 | 26.3 | 24.1 | 16.2 | 66.6 | 26.1 | 7.3 |
| Ae | 4.6 | 3.8 | 21.9 | 23.2 | 21.8 | 66.9 | 29.2 | 3.9 |
| Bf1 | 4.8 | 4.3 | 19.4 | 20.6 | 22.0 | 62.0 | 28.9 | 9.1 |
| Bf2 | 5.0 | 4.3 | 22.6 | 21.7 | 15.4 | 59.7 | 28.4 | 11.9 |
| BC | 5.2 | 4.2 | 26.3 | 19.7 | 13.3 | 59.3 | 27.3 | 13.4 |
| C | 5.1 | 4.3 | 24.6 | 19.6 | 14.2 | 58.4 | 25.1 | 16.5 |

Table 2-23. Well-drained WYVERN SOIL

Location: UTM 20T MF 918402
Slope and aspect: 5%; east
Elevation: 225 m

Parent material: sandy skeletal till over granite bedrock
Classification (1978): Orthic Humo-Ferric Podzol

PROFILE DESCRIPTION

| Horizon | Depth (cm) | Color (dry) | Texture | Structure |  |  | Consistence | Mottles | Coarse fragments (% vol.) | Roots |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | Grade | Size | Kind |  |  |  |  |
| LFH | 14-0 | ...moderately decomposed forest litter... |  |  |  |  |  |  |  |  |
| Ae | 0-8 | light brownish gray (10YR 6/2d) | sandy loam | weak | fine | subangular blocky | very friable | none | 15 | few |
| Bhf | 8-11 | dark reddish brown (5YR 3/4d) | loam | moderate | medium | granular | very friable | none | 15 | plentiful |
| Bf1 | 11-37 | dark brown (7.5YR 4/4d) | gravelly sandy loam | moderate | medium | subangular blocky | friable | none | 20 | few |
| Bf2 | 37-66 | yellowish brown (10YR 5/6d) | gravelly sandy loam | moderate | medium | subangular blocky | friable | none | 30 | very few |
| BC | 66-99 | yellowish brown (10YR 5/4d) | gravelly loamy sand | moderate | fine | granular | firm | none | 45 | none |
| C | 91-100 | yellowish brown (10YR 5/4d) | gravelly loamy sand | structureless |  | massive | firm | none | 35 | none |

Table 2-23. Well-drained WYVERN SOIL (continued)

ANALYSES

| Horizon | Depth (cm) | Organic C (%) | Exchangeable cations (meq/100 g soil) | | | | | Pyrophosphate | | Oxalate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Ca | Mg | Al | K | CEC | Fe (%) | Al (%) | Fe (%) | Al (%) |
| LFH | 14-0 | 43.0 | 10.6 | 3.0 | 0.7 | 1.2 | 15.5 | 0.0 | 0.1 | 0.1 | 0.1 |
| Ae | 0-8 | 3.0 | 0.7 | 0.2 | 2.4 | 0.1 | 3.4 | 0.1 | 0.1 | 0.1 | 0.1 |
| Bhf | 8-11 | 9.6 | 1.0 | 0.3 | 9.8 | 0.2 | 11.3 | 3.2 | 1.1 | 3.3 | 1.1 |
| Bf1 | 11-37 | 3.7 | 0.5 | 0.1 | 2.9 | 0.1 | 3.6 | 1.2 | 2.0 | 1.4 | 2.1 |
| Bf2 | 37-66 | 3.4 | 0.4 | 0.1 | 0.9 | 0.1 | 1.5 | 0.4 | 1.2 | 0.6 | 2.2 |
| BC | 66-91 | 0.6 | 0.4 | 0.1 | 0.5 | 0.1 | 1.1 | 0.1 | 0.3 | 0.2 | 0.7 |
| C | 91-100 | 0.3 | 0.4 | 0.1 | 0.3 | 0.1 | 0.9 | 0.1 | 0.2 | 0.1 | 0.5 |

| Horizon | pH | | Organic matter (%) | Particle size distribution (%) | | | | | | | | Coarse fragments (% wt.) | USLE K factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $H_2O$ | $CaCl_2$ | | VCS | CS | MS | FS | VFS | Total sand | Silt | Clay | | |
| LFH | 4.4 | 3.5 | 73.1 | - | - | - | - | - | - | - | - | - | - |
| Ae | 4.1 | 3.6 | 5.1 | 20.4 | 13.4 | 3.8 | 9.3 | 6.7 | 53.8 | 37.3 | 9.1 | 25.0 | 0.26 |
| Bhf | 4.2 | 3.9 | 16.3 | 18.8 | 11.7 | 4.6 | 7.7 | 7.1 | 49.7 | 36.8 | 13.4 | 25.0 | 0.23 |
| Bf1 | 4.7 | 4.5 | 6.3 | 23.4 | 16.6 | 5.3 | 11.3 | 6.6 | 63.2 | 26.2 | 10.6 | 35.0 | 0.22 |
| Bf2 | 5.6 | 4.7 | 5.7 | 25.0 | 22.0 | 6.1 | 14.8 | 6.5 | 74.4 | 17.8 | 7.8 | 45.0 | 0.17 |
| BC | 5.2 | 4.8 | 1.3 | 28.6 | 19.1 | 8.5 | 14.4 | 8.9 | 79.5 | 17.4 | 3.1 | 55.0 | 0.12 |
| C | 5.3 | 4.9 | 0.5 | 23.2 | 23.0 | 9.6 | 17.6 | 7.1 | 80.5 | 16.7 | 2.8 | 45.0 | 0.27 |

## APPENDIX 3

## GLOSSARY OF TERMS AND ABBREVIATIONS

This glossary covers terms and abbreviations used in Appendix 2 and the interpretive guideline tables. For more information see Day (1983) and Agriculture Canada (1976).

Al Aluminum.

**Base sat. (%)** Base saturation percent is the extent to which the cation exchange complex of the soil is saturated with exchangeable cations other than hydrogen and aluminum.

**Bulk density (g/cm$^3$)** The mass of dry soil per unit bulk volume measured in grams per cubic centimetre.

Ca Calcium.

CEC Cation exchange capacity is the total amount of exchangeable cations that a soil can absorb. In this report CEC is the sum of the exchangeable cations recorded in meq/100 g soil. (See also **exchangeable cations**.)

**Coarse fragment (% wt.)** Mineral soil particles >2 mm are measured as a percentage of the total weight of a soil sample.

**Coarse fragments (% volume)** See **texture**.

**C:N ratio** The ratio of the weight of organic carbon to the weight of total nitrogen in the soil is obtained by dividing the % organic carbon by the % total nitrogen.

**Color** The Munsell color system specifies the relative degrees of three variables of color: hue, value, and chroma. For example 5YR-3/4 is the color of a soil having a hue of 5YR, value of 3, and chroma of 4. The Munsell system also assigns a name to the notation, "dark reddish brown." Colors are recorded on moist(m) or dry(d) soil.

**Consistence** The resistance of the soil material to deformation or rupture (i.e., its strength). Terms used to describe consistence depend on the moisture of the soil.

**Drainage** Soil drainage classes are defined in terms of available water storage capacity and source of water. Soil drainage in a dynamic sense refers to the rapidity and extent of removal of water from soils in relation to additions. It is affected by a number of factors that act separately or in combination, including texture, structure, slope gradient, slope length, water-holding capacity, and evapotranspiration.

Rapidly drained (R) Water is removed from the soil rapidly in relation to supply. Excess water flows downward if underlying material is pervious. Subsurface flow may occur on steep gradients during heavy rainfall. Soils have low available water storage capacity (2.5-4 cm) within the control section and are usually coarse textured, or shallow, or both. Water source is precipitation.

Well drained (W) Water is removed from the soil readily but not rapidly. Excess water flows downward readily into underlying pervious material or laterally as subsurface flow. Soils have intermediate available water storage capacity (4-5 cm) within the control section and are generally intermediate in texture and depth. Water source is precipitation. On slopes subsurface flow may occur for short durations but additions are equaled by losses.

Moderately well drained (MW) Water is removed from the soil somewhat slowly in relation to supply. Excess water is removed somewhat slowly because of low perviousness, shallow water table, lack of gradient, or some combination of these. Soils have intermediate to high water storage capacity (5-6 cm) within the control section and are usually medium to fine textured. Precipitation is the dominant water source in medium- to fine-textured soils; precipitation and significant additions by subsurface flow are necessary in coarse-textured soils.

Imperfectly drained (I) Water is removed from the soil sufficiently slowly in relation to supply to keep the soil wet for a significant part of the growing season. Excess water moves slowly downward if precipitation is the major supply. If subsurface water or groundwater, or both, is the main source, flow rate may vary but the soil remains wet for a significant part of the growing season. Precipitation is the main source if available water storage capacity is high; contribution by subsurface flow or groundwater flow, or both, increases as available water storage capacity decreases. Soils have a wide range in available water supply, texture, and depth and are gleyed equivalents of well-drained subgroups.

Poorly drained (P) Water is removed so slowly in relation to supply that the soil remains wet for a comparatively large part of the time the soil is not frozen. Excess water is evident in the soil for a large part of the time. Subsurface flow or groundwater flow or both, in addition to precipitation are main water sources; there may also be a perched water table, and precipitation may exceed evapotranspiration. Soils have a wide range in available water storage capacity, texture, and depth and are gleyed subgroups, Gleysols, or Organic.

Very poorly drained (VP) Water is removed from the soil so slowly that the water table remains at or on the surface for the greater part of the time the soil is not frozen. Excess water is present in the soil for the greater part of the time. Groundwater flow and subsurface flow are major water sources. Precipitation is less important except where there is a perched water table with precipitation exceeding evapotranspiration. Soils have a wide range in available water storage capacity, texture, and depth, and are either Gleysolic or Organic.

**Exchangeable cations (meq/100 g soil)** Positive ions held or absorbed on negatively charged sites on mineral or organic particles, which in total are referred to as the exchange complex of the soil. Quantitatively, these amounts are conventionally expressed in milliequivalents per 100 grams of soil (meq/100 g). One milliequivalent is the amount of an element or compound that will combine with or replace one milligram of hydrogen. (See **Al**, **Ca**, **CEC**, **K**, **Mg**, and **Na**.)

**Fe** Iron.

**Horizon** A soil layer approximately parallel to the land surface, which differs from other layers in properties such as color, texture, structure, and consistence and in chemical, biological, and physical properties.

**Hydraulic conductivity (cm/h)** The ability of the soil to transmit water vertically when saturated, expressed as a velocity in centimetres per hour.

**K** Potassium.

**Mg** Magnesium.

**Mn** Manganese.

**Mottles** Spots or blotches of different color or shades of color (usually reds, oranges, or reddish browns) interspersed with the dominant soil color. Mottles are oxides of iron and are indicative of soils that have been periodically saturated.

**Na** Sodium.

**Organic C (%)** Percentage by weight carbon present in the soil as a constituent in soil organic matter.

**Organic matter (%)** The organic fraction of the soil as a percentage; including plant and animal residues at various stages of decomposition and substances synthesized by the soil population.

**Particle size distribution (%)** Percentage of the various soil separates in a soil sample. The abbreviations, names and sizes of the separates are as follows:

| | |
|---|---|
| VCS | very coarse sand (2-1 mm) |
| CS | coarse sand (2-0.5 mm) |
| MS | medium sand (0.5-0.25 mm) |
| FS | fine sand (0.25-0.1 mm) |
| VFS | very fine sand (0.1-0.05 mm) |
| Total sand | all the above (2-0.05 mm) |
| Silt | (0.05-0.002 mm) |
| Clay | (<0.002 mm) |

**pH** The negative logarithm of the hydrogen ion activity of the soil. The degree of acidity or alkalinity of the soil measured in water ($H_2O$) or in a solution of calcium chloride ($CaCl_2$).

**Rockiness** Rockiness refers to bedrock outcropping at the earth's surface. Bedrock outcrops are incapable of supporting crops and interfere with the efficient operation of farm machinery. Classes are distinguished on the percentage of surface area covered by exposed bedrock and are defined in terms of the amount of surface covered by bedrock and the distance between bedrock exposures as follows:

| Class name | Class | Surface covered (%) | Distance between outcrops (m) |
|---|---|---|---|
| Nonrocky | 0 | <2 | >100 |
| Slightly rocky | 1 | 2-10 | 35-100 |
| Moderately rocky | 2 | 10-25 | 10-35 |
| Very rocky | 3 | 25-50 | 3.5-10 |
| Exceedingly rocky | 4 | 50-90 | <3.5 |
| Excessively rocky | 5 | >90 | |

**Stoniness** Refers to the rock fragments on the surface of the soils or those protruding above ground. Stony soils interfere with the efficient operation of farm machinery for cultivation, seedbed preparation, and harvesting. Farming stony land increases the wear and frequency of repair on farming implements. The degree of limitation that stones impose is related to their number, size, and spacing at the soil surface. The following classes are defined in terms of the amount of surface stones greater than 25 cm in diameter (or greater than 38 cm if flat), and their spacing:

| Class name | Class | Surface covered (%) | Distance between stones (m) |
|---|---|---|---|
| Nonstony | 0 | <0.01 | >25 |
| Slightly stony | 1 | 0.01-0.1 | 8-25 |
| Moderately stony | 2 | 0.1-3 | 1-8 |
| Very stony | 3 | 3-15 | 0.5-1 |
| Exceedingly stony | 4 | 15-50 | 0.1-0.5 |
| Excessively stony | 5 | >50 | <0.1 |

**Structure** Refers to the aggregation of primary soil particles into compound particles, units, or peds. Peds are classified on the basis of the size, shape, or kind and degree of distinctness or grade. Structure in this report refers to primary structure.

**Texture** Relative proportions of the soil separates (sand, silt, and clay) in a soil as described by the classes of soil texture shown in the textural triangle (see Fig. 3-1).

| | |
|---|---|
| S | sand |
| LS | loamy sand |
| SL | sandy loam |
| L | loam |
| SiL | silt loam |
| Si | silt |
| SCL | sandy clay loam |
| CL | clay loam |
| SiCL | silty clay loam |
| SC | sandy clay |
| SiC | silty clay |
| C | clay |

The names of textural classes may be modified by adding the following terms when significant amounts of coarse fragments are present (particles >2 mm):

| | |
|---|---|
| G | gravelly (20-50% by volume) |
| VG | very gravelly (50-90% by volume) |

**Total N (%)** Percentage by weight of total nitrogen present in the soil.

**USLE K factor** The Universal Soil Loss Equation (USLE) soil erodibility factor (K) is the soil loss rate per erosion index unit for a specified soil as measured on a unit plot, which is defined as a 22.1 m length of uniform 9% slope continuously in clean tilled fallow (Wischmeier et al. 1971). The K factor has been determined by use of the soil-erodibility nomograph (see Fig. 10).

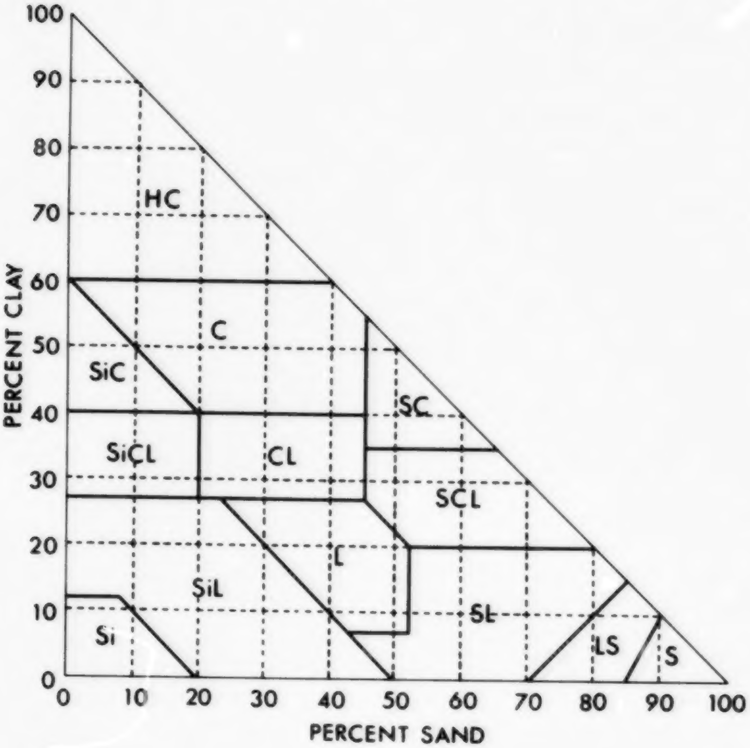


Fig. 3-1. Soil textural triangle. Percentages of clay and sand in the main textural classes of soils; the remainder of each class is silt.

# APPENDIX 4

## ENGINEERING SOIL CLASSIFICATION AND DATA

### UNIFIED SOIL CLASSIFICATION SYSTEM

The unified soil classification system classifies soils according to their value as construction material. In this system soils are grouped on the basis of particle size distribution, plasticity, liquid limit, and organic matter content.

The soils are first divided into coarse-grained, fine-grained, or highly organic soils (Table 4-1). The coarse-grained soils have more than 50% by weight coarser than 0.074 mm (No. 200 sieve). They are given the symbol G (gravel) if more than half of the coarse particles are coarser than 4.76 mm (No. 4 sieve) and S (sand) if more than half are finer. The G or S is followed by a second letter that describes the gradation:

| | |
|---|---|
| W | well-graded with little or no fines |
| P | poorly graded, uniform, or gap-graded with little or no finer |
| M | containing silt or silt and sand |
| C | containing clay or sand and clay. |

The fine-grained soils (more than half finer than the No. 200 sieve) are divided into three groups:

| | |
|---|---|
| C | clays |
| M | silts and silty clays |
| O | organic silts and clays. |

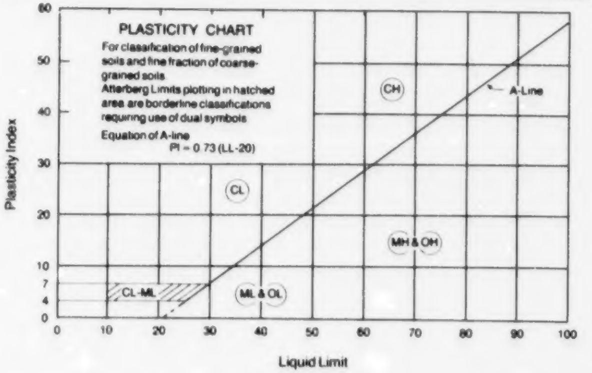
These symbols are followed by a second letter denoting the liquid limit or relative compressibility:

| | |
|---|---|
| L | a liquid limit less than 50 |
| H | a liquid limit exceeding 50. |

The plasticity chart (Table 4-1) is the basis for dividing the fine-grained soils. Silts plot below the "A-line" and clays plot below the "A-line."

For more information on the unified system, see Asphalt Institute (1969).

Table 4-1. The Unified Soil Classification System

| Major Divisions | | | Group Symbols | Typical Names | Classification Criteria | | |
|---|---|---|---|---|---|---|---|
| Coarse-Grained Soils<br>More than 50% retained on No. 200 sieve* | Gravels<br>50% or more of coarse fraction retained on No. 4 sieve | Clean Gravels | GW | Well-graded gravels and gravel-sand mixtures, little or no fines | Classification on basis of percentage of fines<br>Less than 5% pass No. 200 sieve GW, GP, SW, SP<br>More than 12% pass No. 200 sieve GM, GC, SM, SC<br>5% to 12% pass No. 200 sieve Borderline classification requiring use of dual symbols | $C_u = D_{60}/D_{10}$ Greater than 4<br>$C_z = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 | |
| | | | GP | Poorly graded gravels and gravel-sand mixtures, little or no fines | | Not meeting both criteria for GW | |
| | | Gravels with Fines | GM | Silty gravels, gravel-sand-silt mixtures | | Atterberg limits plot below "A" line or plasticity index less than 4 | Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols |
| | | | GC | Clayed gravels, gravel-sand-clay mixtures | | Atterberg limits plot above "A" line and plasticity index greater than 7 | |
| | Sands<br>More than 50% of coarse fraction passes No. 4 sieve | Clean Sands | SW | Well-graded sands and gravelly sands, little or no fines | | $C_u = D_{60}/D_{10}$ Greater than 6<br>$C_z = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 | |
| | | | SP | Poorly graded sands and gravelly sands, little or no fines | | Not meeting both criteria for SW | |
| | | Sands with Fines | SM | Silty sands, sand-silt mixtures | | Atterberg limits plot above "A" line or plasticity index less than 4 | Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols |
| | | | SC | Clayey sands, sand-clay mixtures | | Atterberg limits plot below "A" line and plasticity index greater than 7 | |
| Fine-Grained Soils<br>50% or more passes No. 200 sieve* | Silts and Clays<br>Liquid limit 50% or less | | ML | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands | <br>PLASTICITY CHART<br>For classification of fine-grained soils and fine fraction of coarse-grained soils.<br>Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols<br>Equation of A-line<br>PI = 0.73 (LL-20)<br> | | |
| | | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays | | | |
| | | | OL | Organic silts and organic silty clays of low plasticity | | | |
| | Silts and Clays<br>Liquid limit greater than 50% | | MH | Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts | | | |
| | | | CH | Inorganic clays of high plasticity, fat clays | | | |
| | | | HO | Organic clays of medium to high plasticity | | | |
| Highly Organic Soils | | | PT | Peat, muck, and other highly organic soils | | | |

*Based on the material passing the 3-in. (75 mm) sieve

Source: PCA Soil Primer. 1973. Portland Cement Association, Skokie, Ill. 60076.

## AASHO CLASSIFICATION SYSTEM

The American Association of State Highway Officials (AASHO) system of soil classification is based on the performance of soils under highway use. Soils having about the same general load-carrying capacity and service characteristics are grouped together to form seven basic soil groups that are designated A-1 through A-7. In general, the best soils for highway subgrades are assessed as A-1 and the poorest are classified A-7.

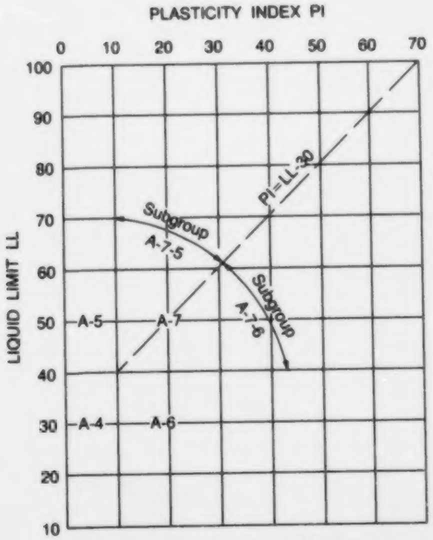
The AASHO system divides all soils into two categories; granular soils (with 35% or less passing the No. 200 sieve) and silt-clay soils (with more than 35% passing the No. 200 sieve). These two categories are subdivided further, depending on their particle size distribution, as determined by sieve analysis, and their liquid limit and plasticity index values (Table 4-2). For more information on this system, see Asphalt Institute (1969).

Engineering data for the soils are presented in Table 4-3.

Table 4-2. The AASHO Soil Classification System

| General classifiation | Granular materials (35% or less passing No. 200) | | | | | | | Silt-clay materials (More than 35% passing No. 200) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Group classification | A-1 | | A-3 | A-2 | | | | A-4 | A-5 | A-6 | A-7 |
| | A-1-a | A-1-b | | A-2-4 | A-2-5 | A-2-6 | A-2-7 | | | | A-7-5<br>A-7-6 |
| Sieve analysis, percent passing:<br>No. 10<br>No. 40<br>No. 200 | 50 max.<br>30 max.<br>15 max. | –<br>50 max.<br>25 max. | –<br>51 min.<br>10 max. | –<br>–<br>35 max. | –<br>–<br>35 max. | –<br>–<br>35 max. | –<br>–<br>35 max. | –<br>–<br>36 min. | –<br>–<br>36 min. | –<br>–<br>36 min. | –<br>–<br>36 min. |
| Characteristics of fraction passing No. 40:<br>Liquid limit<br>Plasticity index | –<br>6 max. | | –<br>NP | 40 max.<br>10 max. | 41 min.<br>10 max. | 40 max.<br>11 min. | 41 min.<br>11 min. | 40 max.<br>10 max. | 41 min.<br>10 max. | 40 max.<br>11 min. | 41 min.<br>11 min.* |
| Usual types of significant constituent materials | Stone fragments, gravel and sand | | Fine sand | Silty or clayey gravel and sand | | | | Silty soils | | Clayey soils | |
| General rating as subgrade | Excellent to good | | | | | Fair to poor | | | | | |

*Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30.



**Liquid limit and plasticity index ranges for A-4, A-5, A-6, and A-7 subgrade groups**

Source: PCA Soil Primer. 1973. Portland Cement Association, Skokie, Ill. 60076.

Table 4-3. Engineering data for soil parent materials

| Map symbol | Soil association name | Depth (cm) | CSSC soil texture | Estimated classification | | Coarse fragments (% by wt.) | Percent passing sieve number | | | Liquid limit | Plastic limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Unified | AASHO | >2mm | 10 | 40 | 200 | | | |
| Ac | Acadia | 85-100 | silt loam | ML | A-4 | 0 | 100 | 100 | 98 | 31 | 24 | 7 |
| Cd | Cobequid | 50-64 | very gravelly silt loam | GM | A-1 | 50 | 50 | 31 | 23 | 15 | *NP | NP |
| Cd | Cobequid | 69-100 | very gravelly sandy loam | GM | A-1 | 62 | 38 | 30 | 21 | 14 | NP | NP |
| Cm | Cumberland | 59-100 | very gravelly sand | GW | A-1 | 61 | 39 | 10 | 3 | 11 | NP | NP |
| Dg | Diligence | 58-100 | gravelly silty clay loam | ML | A-4 | 38 | 62 | 58 | 56 | 26 | 23 | 3 |
| Fo | Folly | 58-71 | gravelly sandy loam | GM | A-2 | 41 | 59 | 52 | 29 | 19 | 17 | 2 |
| Fs | Fash | 60-80 | silt loam | ML | A-4 | 0 | 100 | 100 | 91 | - | - | - |
| Fs | Fash | 75-100 | silt loam | ML | A-4 | 0 | 100 | 100 | 89 | - | - | - |
| Fs | Fash | 120-130 | silty clay | CL | A-7 | 0 | 100 | 100 | 99 | - | - | - |
| Hd | Hansford | 64-100 | gravelly loam | SM | A-2-4 | 39 | 61 | 54 | 35 | 20 | 19 | 1 |
| He | Hebert | 74-100 | very gravelly loamy sand | GW | A-1 | 62 | 38 | 26 | 12 | 12 | NP | NP |
| Kh | Kirkhill | 40-75 | gravelly loam | GM | A-2 | 54 | 46 | 33 | 26 | 21 | 20 | 1 |
| Mi | Millbrook | 91-100 | gravelly loam | SC | A-4 | 23 | 77 | 64 | 48 | 31 | 23 | 8 |
| Mi | Millbrook | 46-60 | gravelly loam | ML-CL | A-4 | 26 | 74 | 65 | 50 | 33 | 24 | 9 |
| Ph | Perch Lake | 70-100 | gravelly sandy loam | GM | A-1 | 59 | 41 | 27 | 15 | 19 | NP | NP |

(continued)

Table 4-3. Engineering data for soil parent materials (concluded)

| Map symbol | Soil association name | Depth (cm) | CSSC soil texture | Estimated classification | | Coarse fragments (% by wt.) | Percent passing sieve number | | | Liquid limit | Plastic limit | Plasticity index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Unified | AASHO | >2mm | 10 | 40 | 200 | | | |
| Pp | Portapique | 67-100 | gravelly sand | SP | A-1 | 42 | 58 | 25 | 4 | 12 | NP | NP |
| Pp | Portapique | 76-120 | very gravelly sand | GW-GM | A-1 | 69 | 31 | 20 | 5 | 13 | NP | NP |
| Pu | Pugwash | 76-100 | sandy loam | SM | A-4 | 0 | 100 | 88 | 48 | 23 | 22 | 1 |
| Pu | Pugwash | 127-147 | sandy loam | SM | A-4 | 0 | 100 | 92 | 59 | 24 | 22 | 2 |
| Qu | Queens | 70-100 | loam | CL | A-6 | 22 | 78 | 71 | 50 | 26 | 16 | 10 |
| Qu | Queens | 76-100 | clay loam | CL | A-6 | 0 | 100 | 93 | 70 | 30 | 19 | 11 |
| Ra | Rawdon | 46-65 | gravelly loam | GM | A-2-4 | 50 | 50 | 36 | 28 | 19 | 16 | 3 |
| Ry | Rossway | 30-60 | gravelly sandy loam | SM | A-1 | 44 | 56 | 45 | 21 | 16 | NP | NP |
| Ry | Rossway | 37-54 | very gravelly sandy loam | GM-GW | A-1 | 76 | 24 | 19 | 12 | 14 | NP | NP |
| Se | Stewiacke | 98-107 | clay loam | CL | A-6 | 0 | 100 | 99 | 86 | 36 | 20 | 16 |
| Tm | Thom | 70-100 | gravelly loam | GM | A-2-4 | 57 | 43 | 34 | 26 | 18 | 16 | 2 |
| Tu | Truro | 89-102 | sand | SP-SM | A-3 | 0 | 100 | 54 | 9 | 14 | NP | NP |
| Tu | Truro | 76-100 | loamy sand | SM | A-4 | 8 | 92 | 81 | 36 | 15 | NP | NP |
| Wb | Westbrook | 67-100 | very gravelly sandy loam | GM | A-1 | 64 | 36 | 19 | 13 | 17 | NP | NP |
| Wo | Woodbourne | 85-100 | gravelly loam | SC | A-4 | 26 | 74 | 64 | 41 | 20 | 12 | 8 |
| Wd | Woodville | 81-100 | sandy loam | SM | A-4 | 0 | 100 | 88 | 49 | 23 | 22 | 1 |
| Wd | Woodville | 53-100 | sandy loam | ML | A-4 | 0 | 100 | 94 | 58 | 24 | 22 | 2 |
| Wn | Wyvern | 91-100 | gravelly | GM | A-1 | 45 | 55 | 30 | 13 | 16 | NP | NP |

*NP - Non plastic